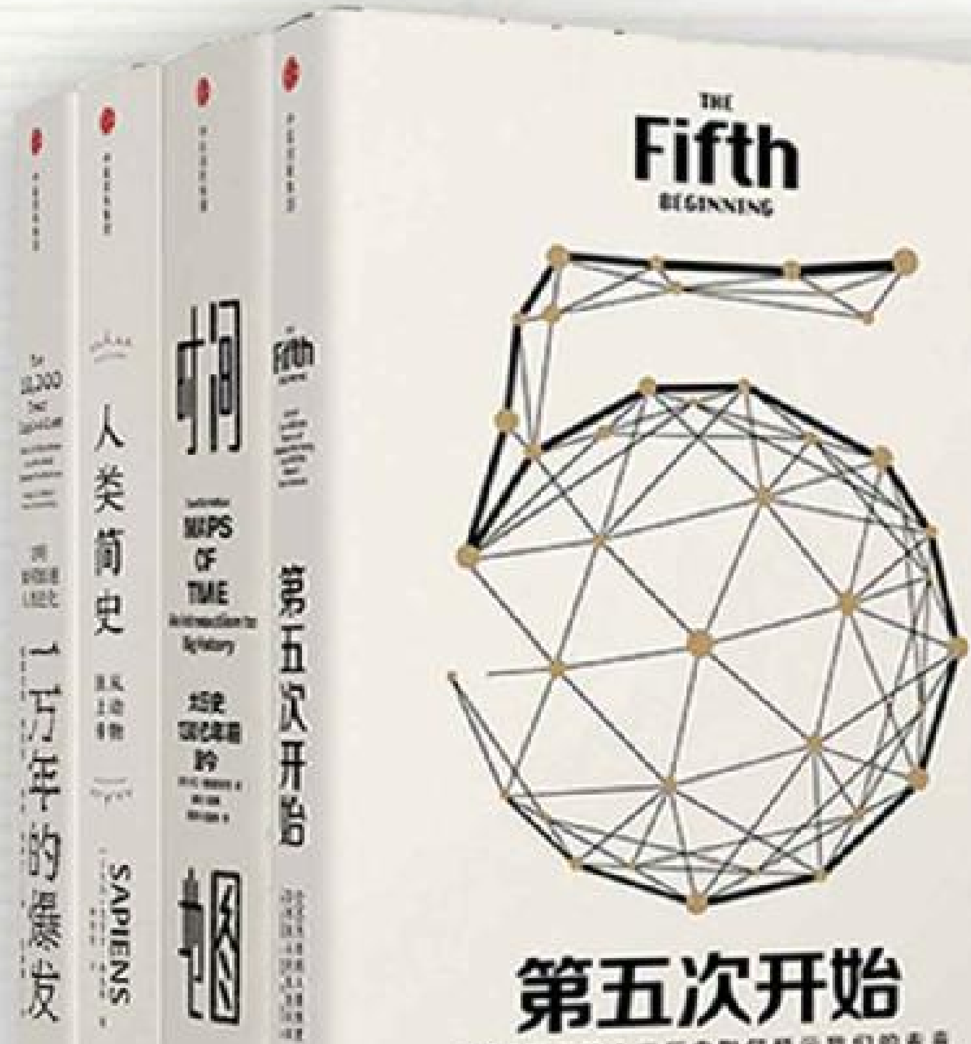
《见识丛书·大历史选集》

（套装共4册）



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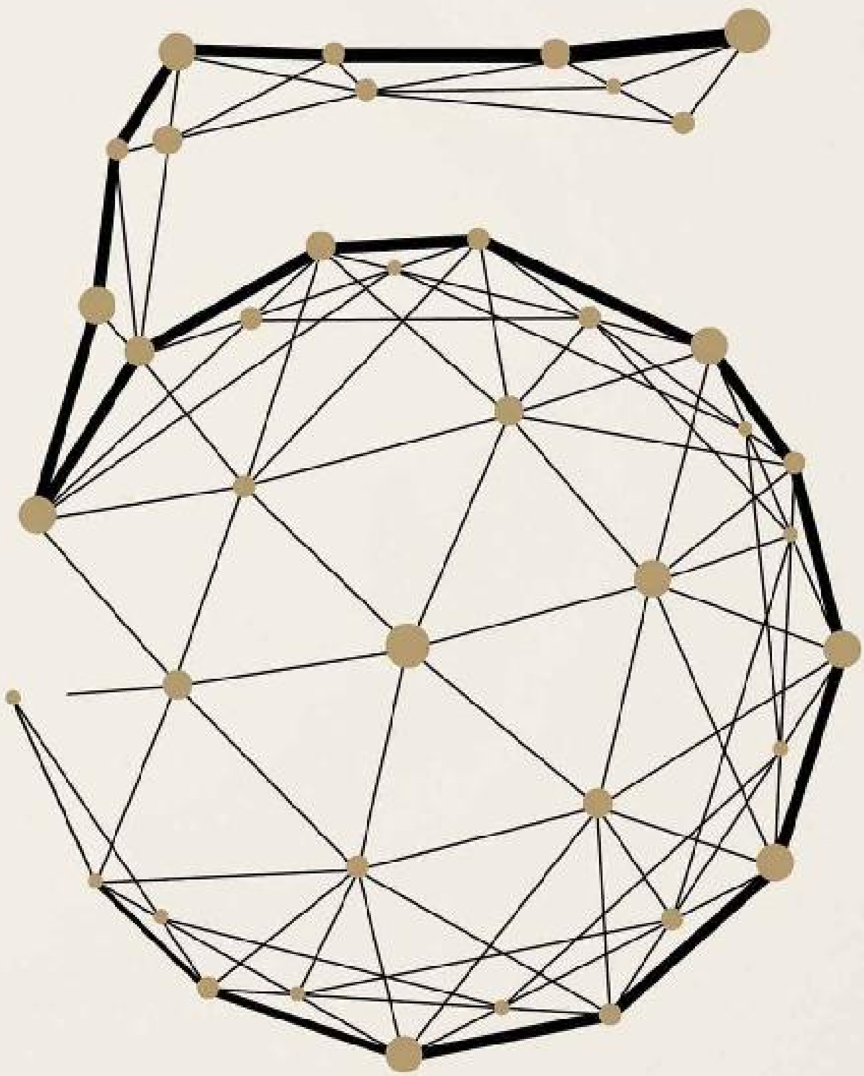
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THE

Fifth

BEGINNING

What Six Million Years of Human History Can Tell Us About Our Future



第五次开始

600万年的人类历史如何预示我们的未来

［美］罗伯特·L. 凯利（Robert L. Kelly）著　徐坚　译

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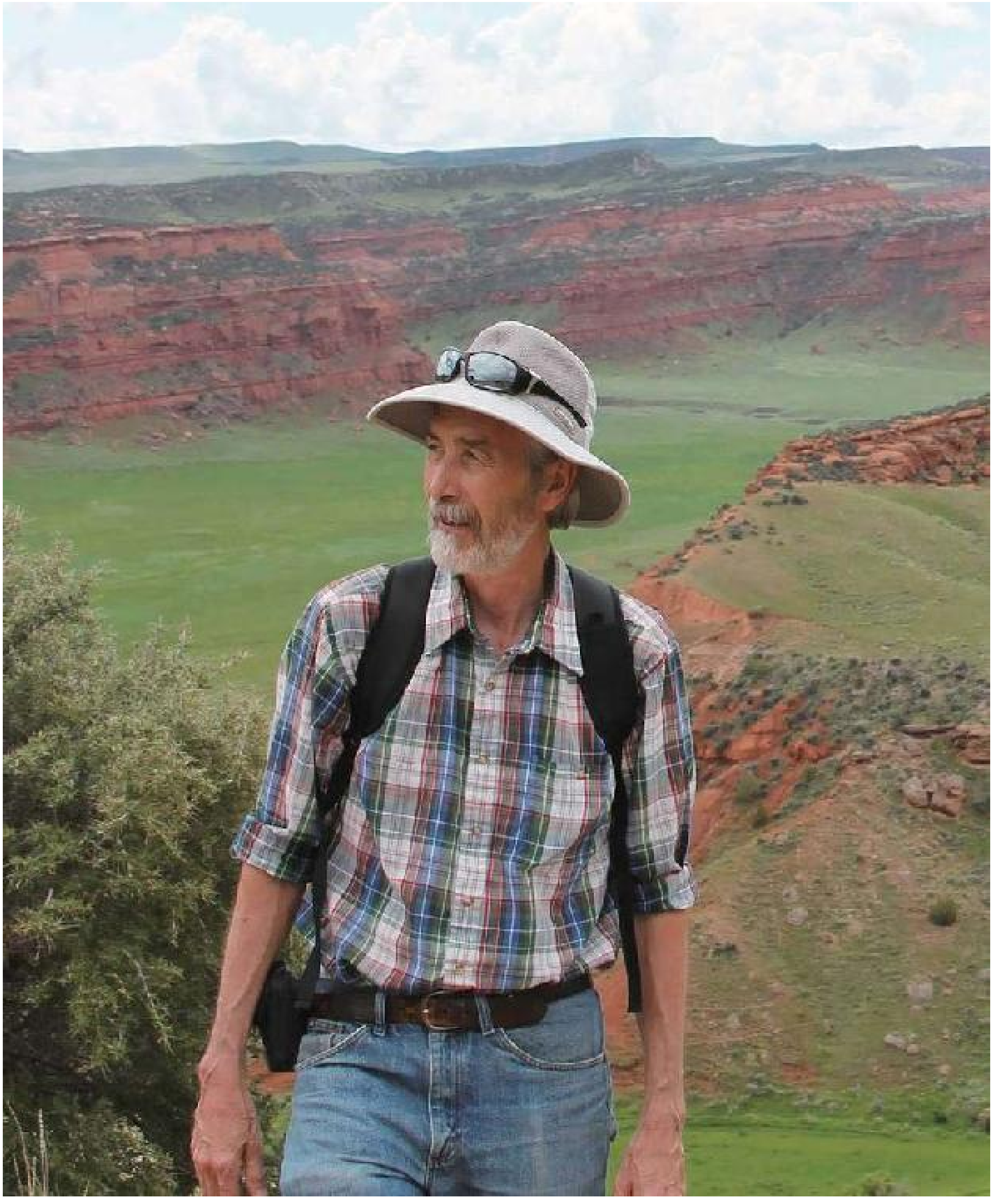
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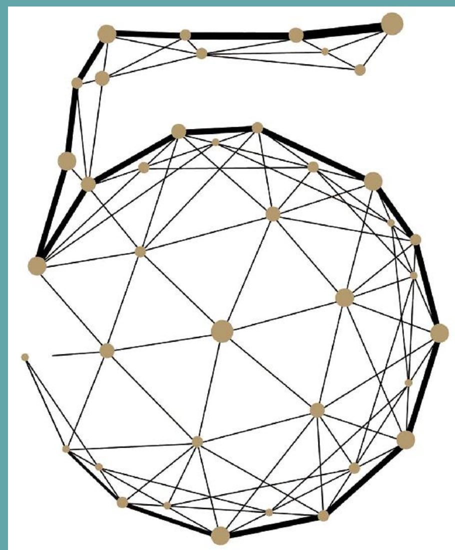
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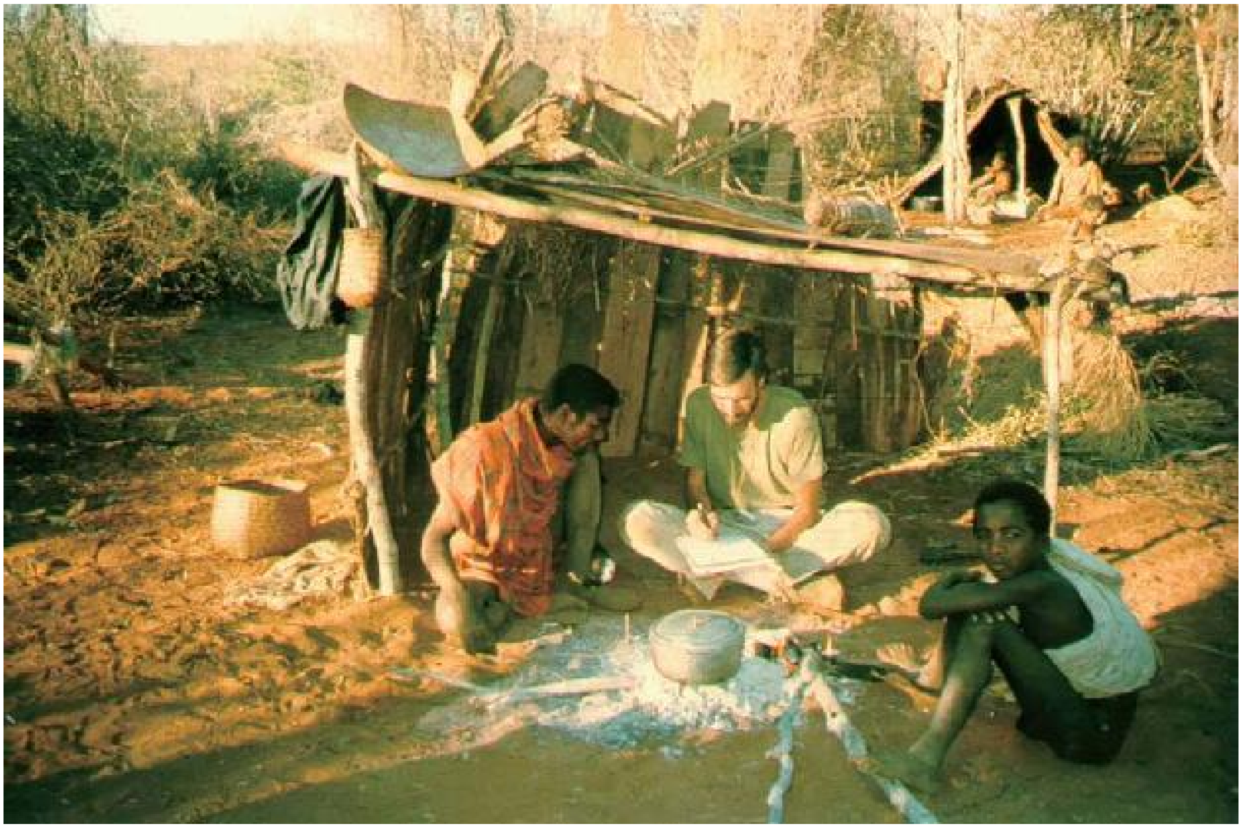
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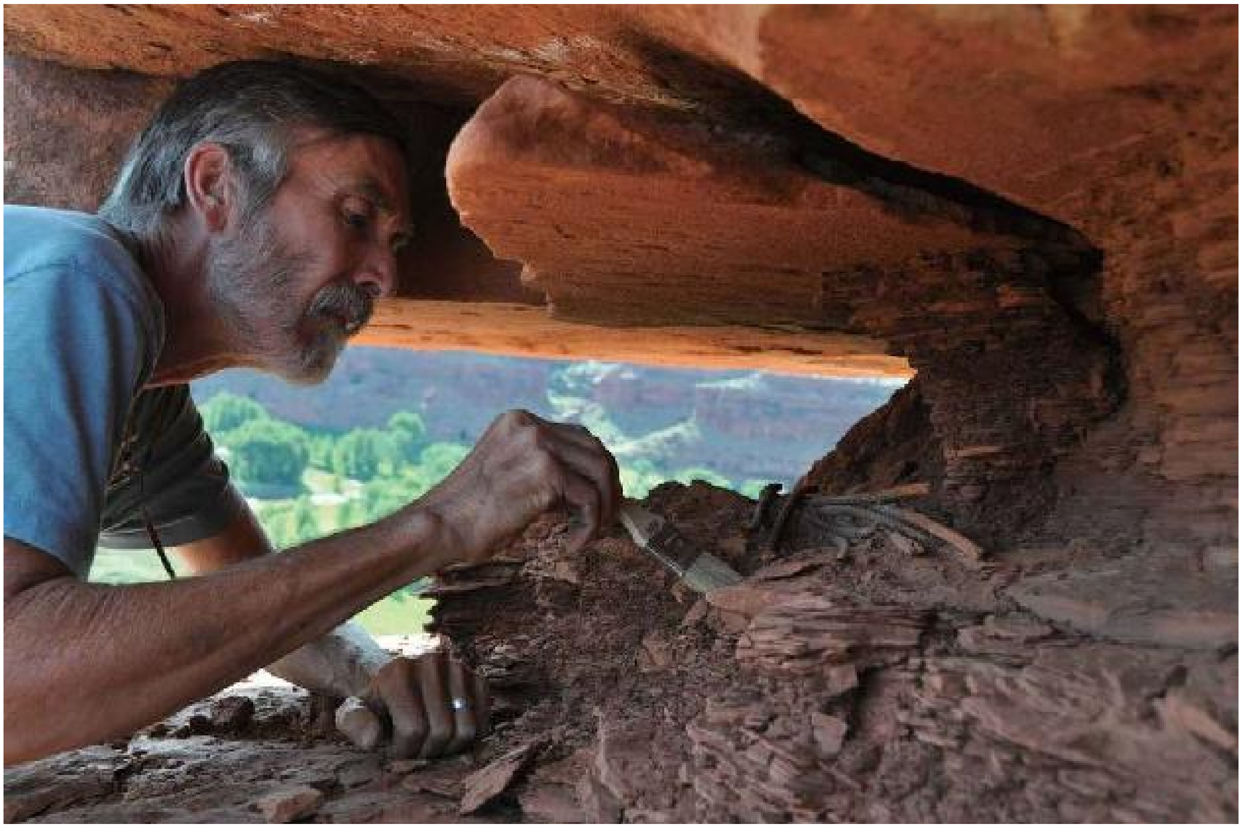
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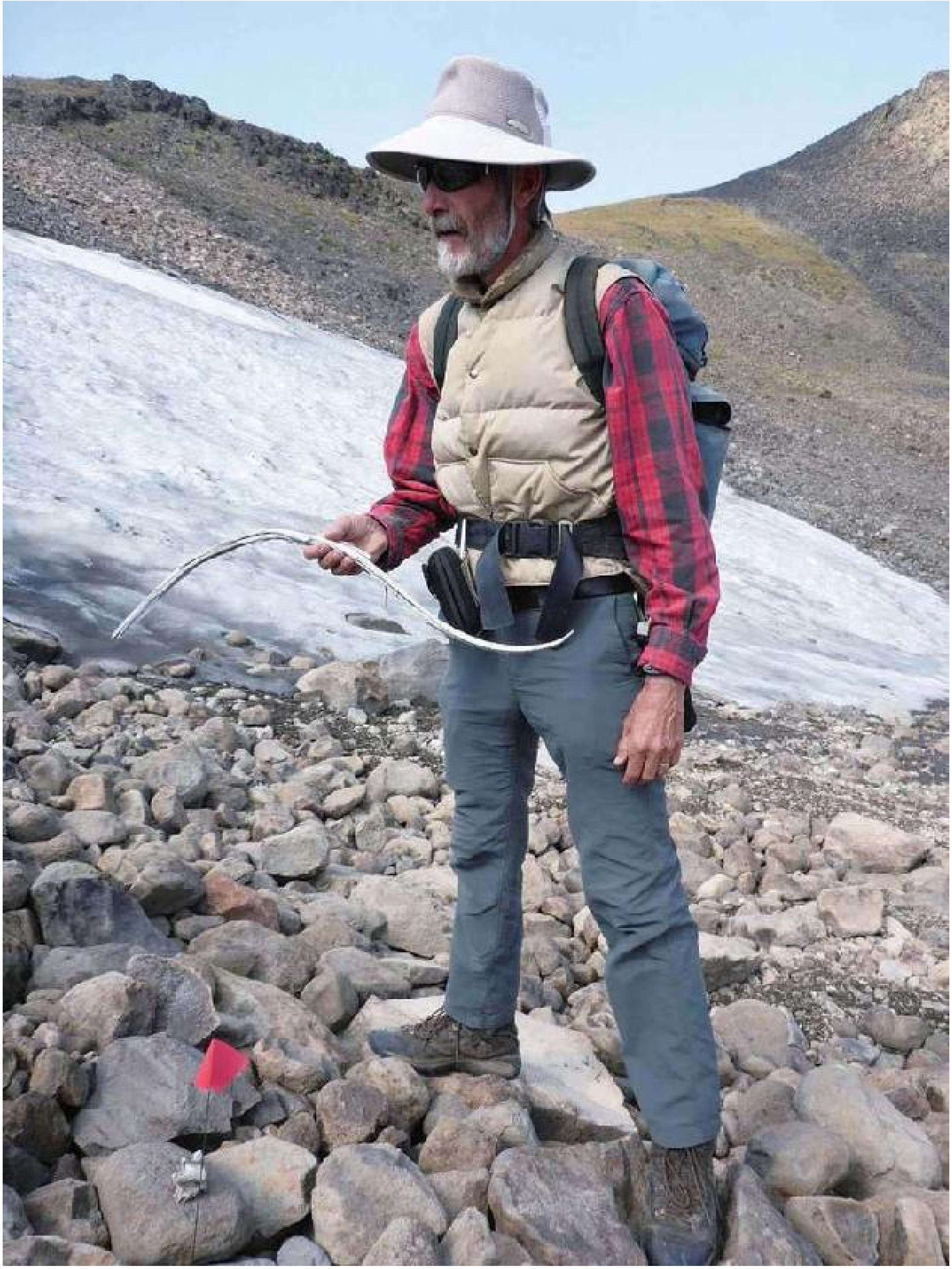
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[6] Diamond□2012□□Wilson□2002, 2012, 2014□.

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[8] Kaplan□1996□.

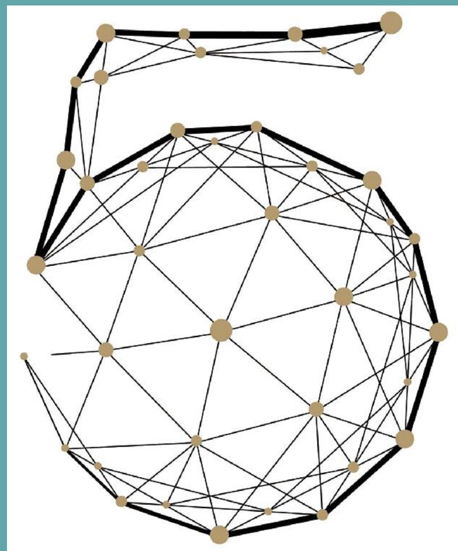
[9] Hardoon, Ayele and Fuentes-Nieva□2016□.□□□□□□□□□□□□□□□□□□

[10] Gore□2013□; Kissinger□2014□; Kaplan□1996□.

[11] Kolbert□2014□; Klein□2015□; Vince□2014□; Weisman□2014□; Oreskes and Conway□2014□;Steffen, Broadgate, et al.□2015□; Steffen, Richardson, et al.□2015□.

[12] Weisman□2014□.

[13] Wright□2000□; Ridley□2010□; Pinker□2012□; Kenny□2012□; Goldstein□2012□; Deaton□2013□; Ackerman□2014□. □□□□Human Security Report Project□2011□□



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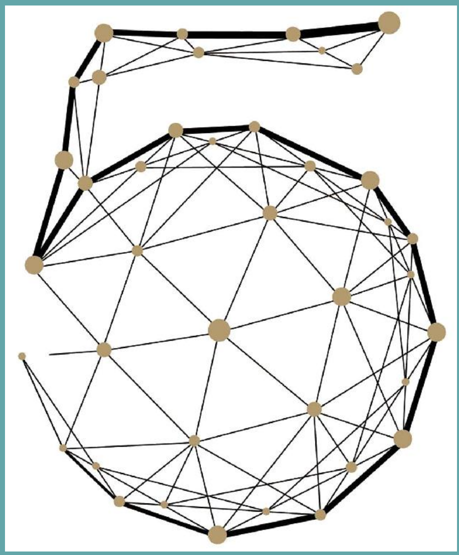
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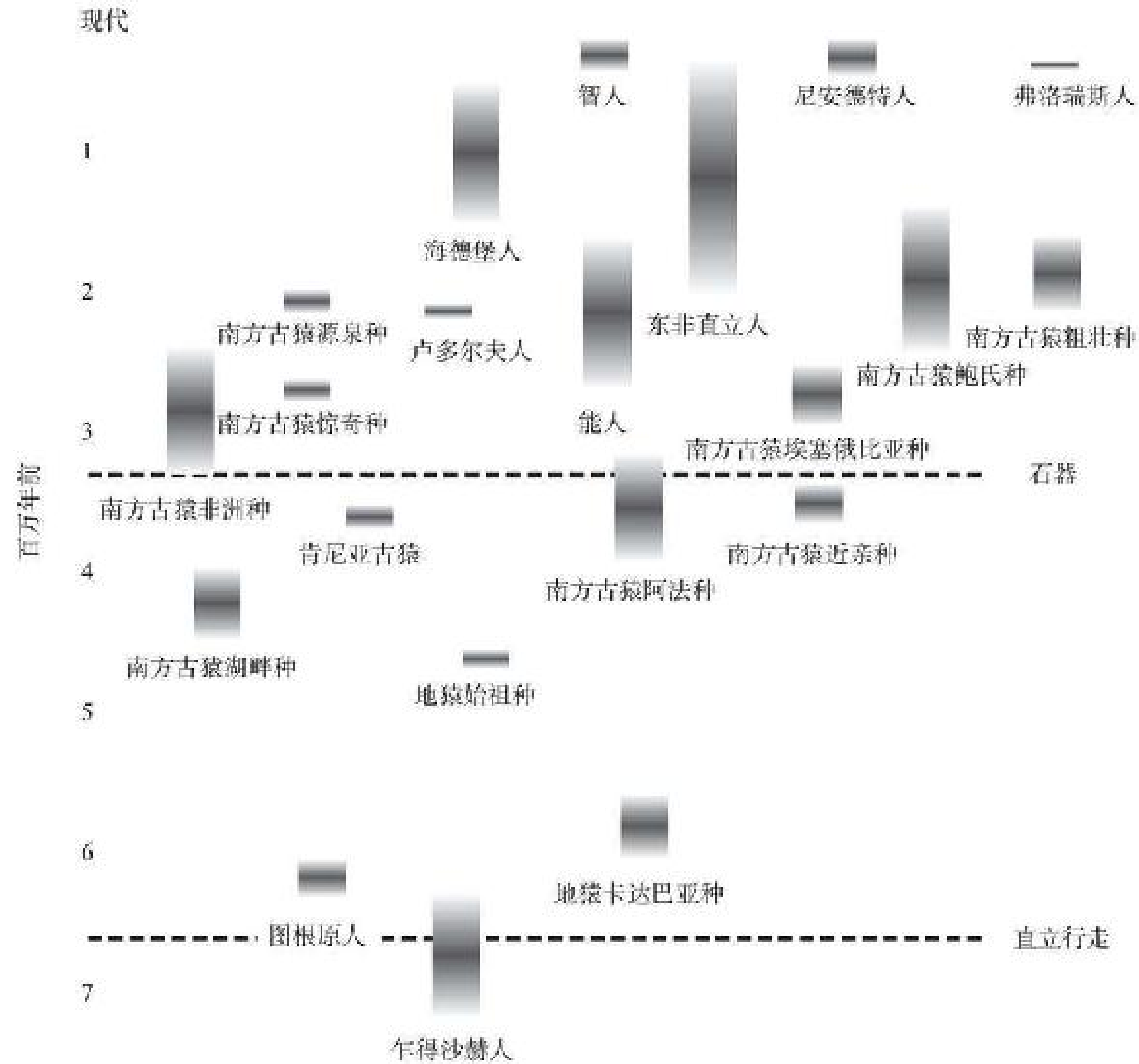
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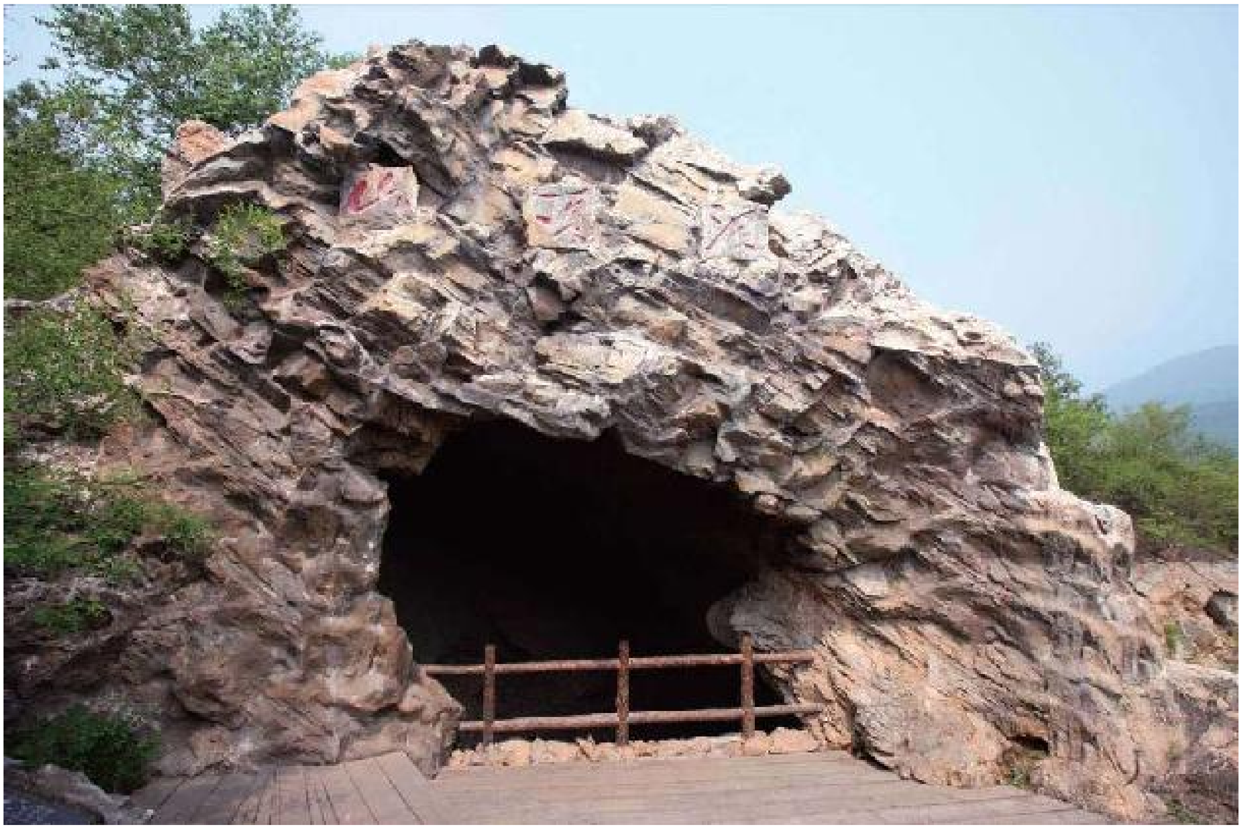
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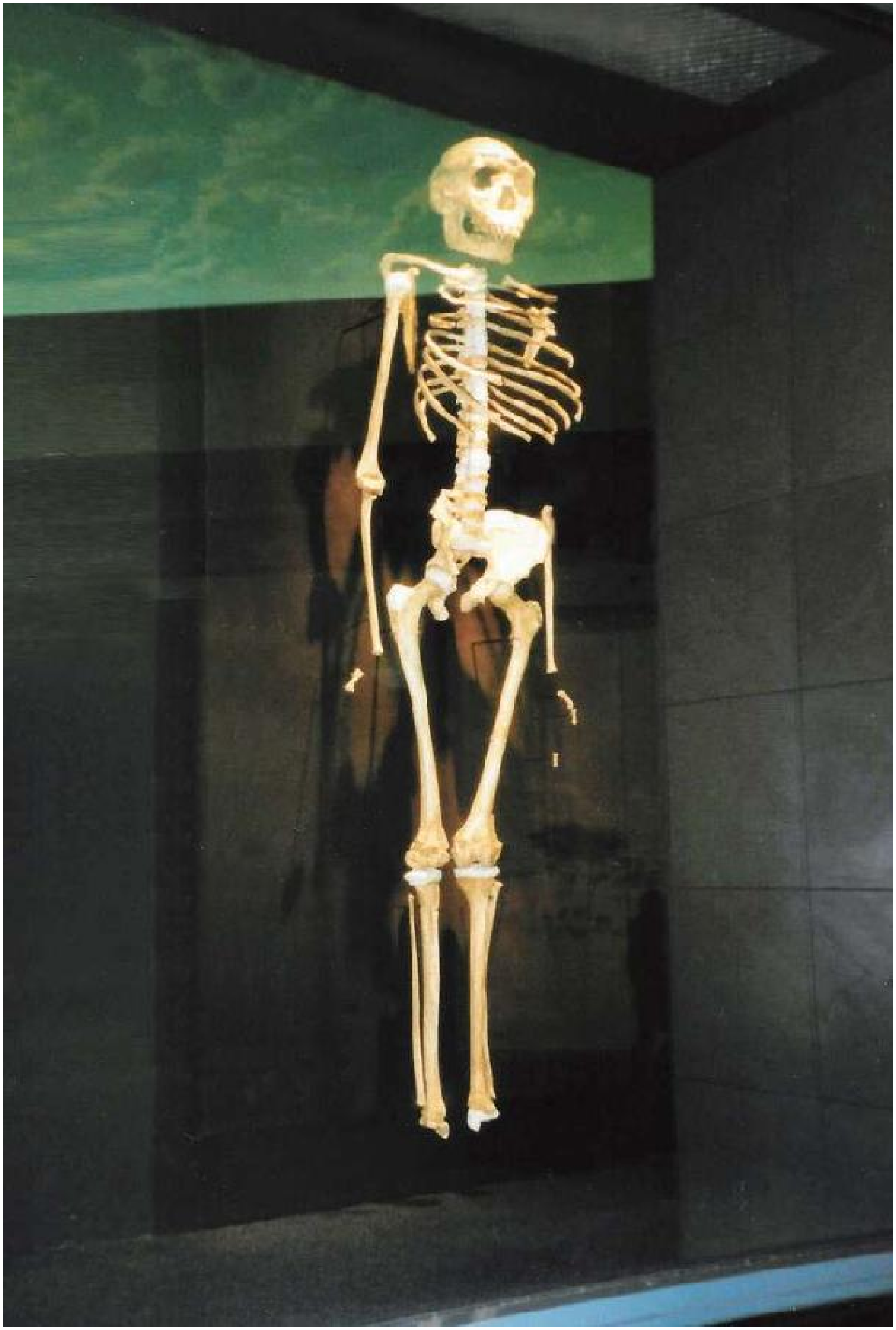
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[illegible]3-6 [illegible]75[illegible]Marieka Arksey[illegible]

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[illegible]

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[illegible]4[illegible]5[illegible]6[illegible]—[illegible]4—5[illegible]

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[illegible]

[illegible]150[illegible]

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[1] Harmand et al.（2015）.[illegible]360[illegible]330[illegible]

[2] [illegible]“[illegible]”[illegible]Pan troglodytes[illegible]

[3] [illegible]Marks（2002）[illegible]

[4] Napier（1970）.

[5] [illegible]“[illegible]”[illegible]Rodham and McHerry（1980[illegible]Vaugham（2003）[illegible]Owen Lovejoy（1988[illegible]Lovejoy[illegible]

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[6] Toth and Schick[illegible]2009[illegible].

[7] Thieme[illegible]1997[illegible].[illegible]30[illegible]

[8] Moura and Lee[illegible]2004[illegible]

[9] [illegible]H. habilis[illegible]H. rudolfensis[illegible]A. garhi[illegible]“[illegible]”[illegible]200[illegible]400[illegible]

[10] Ungar[illegible]2004[illegible]2012[illegible].[illegible]200[illegible]Ferrato wt al.[illegible]2013[illegible]

[11] Walker and Leakey[illegible]1993[illegible]11[illegible]Homo ergaster[illegible]67[illegible][1][illegible]

[12] Wrangham[illegible]2009[illegible]; Gowlett and Wrangham[illegible]2013[illegible]; Zink and Lieberman[illegible]2016[illegible].

[13] Aiello and Wheeler[illegible]1995[illegible].

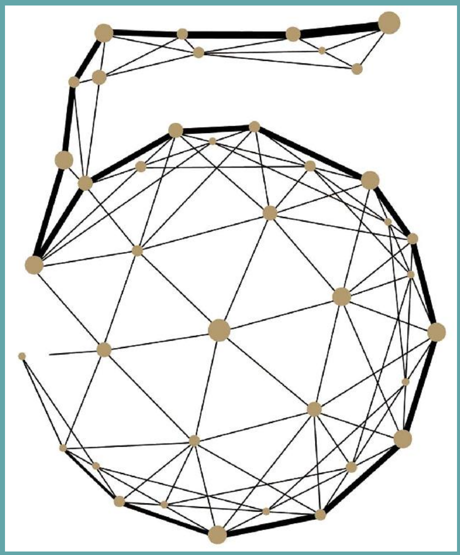
[14] Berna et al.[illegible]2011[illegible]“[illegible]”[illegible]40[illegible]

[15] Ferring et al.[illegible]2011[illegible].

[16] [illegible]Homo ergaster[illegible]Homo erectus[illegible]Lordkipanidze et al.[illegible]2013[illegible]

[17] [illegible]

[18] Lee[illegible]1980[illegible].



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[illegible]

——L. P.[illegible]（L. P. Hartley）

[illegible]《*The Go-Between*》

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2.[illegible]……

3.[illegible]……

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5.[illegible]……

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[illegible]·[illegible]Lawrence Barham[illegible][7][illegible]1[illegible]2[illegible]3[illegible]4[illegible]50[illegible]

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[illegible]$FOXP_2$[illegible]80[illegible]

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[illegible]

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20[illegible]50[illegible]Mistassini Cree[illegible]·[illegible]Eleanor Leacock[illegible]

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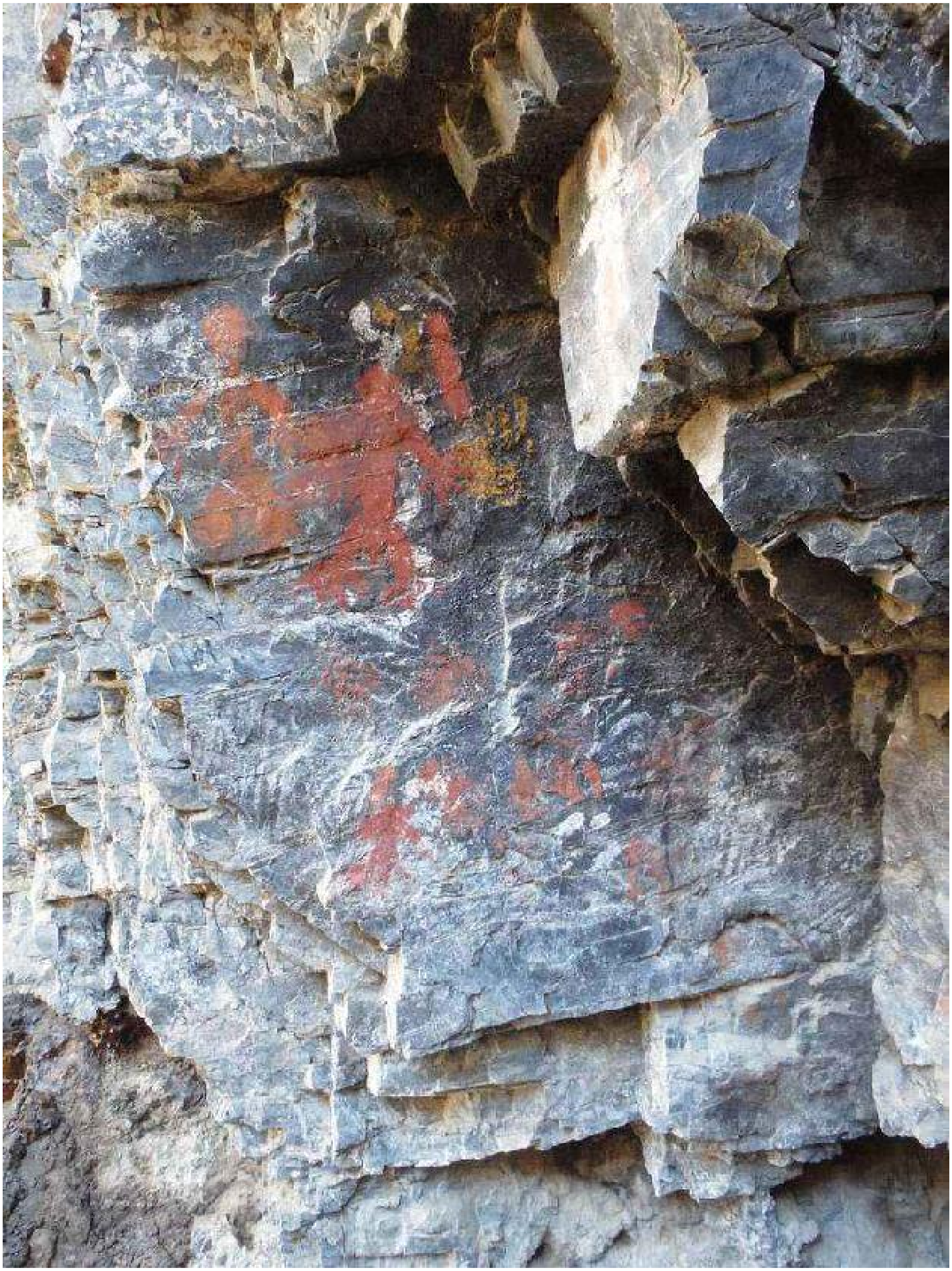
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[illegible]“[illegible]”[illegible]·[illegible]Norman Rockwell[illegible]20[illegible]·[illegible]Pete Seeger[illegible][12][illegible]“[illegible]”[illegible]Pussy Riot[illegible]

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[illegible]7.4[illegible]“[illegible]”[illegible][17][illegible]7[illegible][18][illegible]“[illegible]”[illegible]

[illegible]——[illegible]4[illegible]

[illegible]4[illegible]

[illegible]·[illegible]——[illegible]David Lewis-Williams[illegible][19][illegible]



[illegible]4-2 [illegible]17[illegible]4[illegible]Robert Kelly[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]4[illegible]

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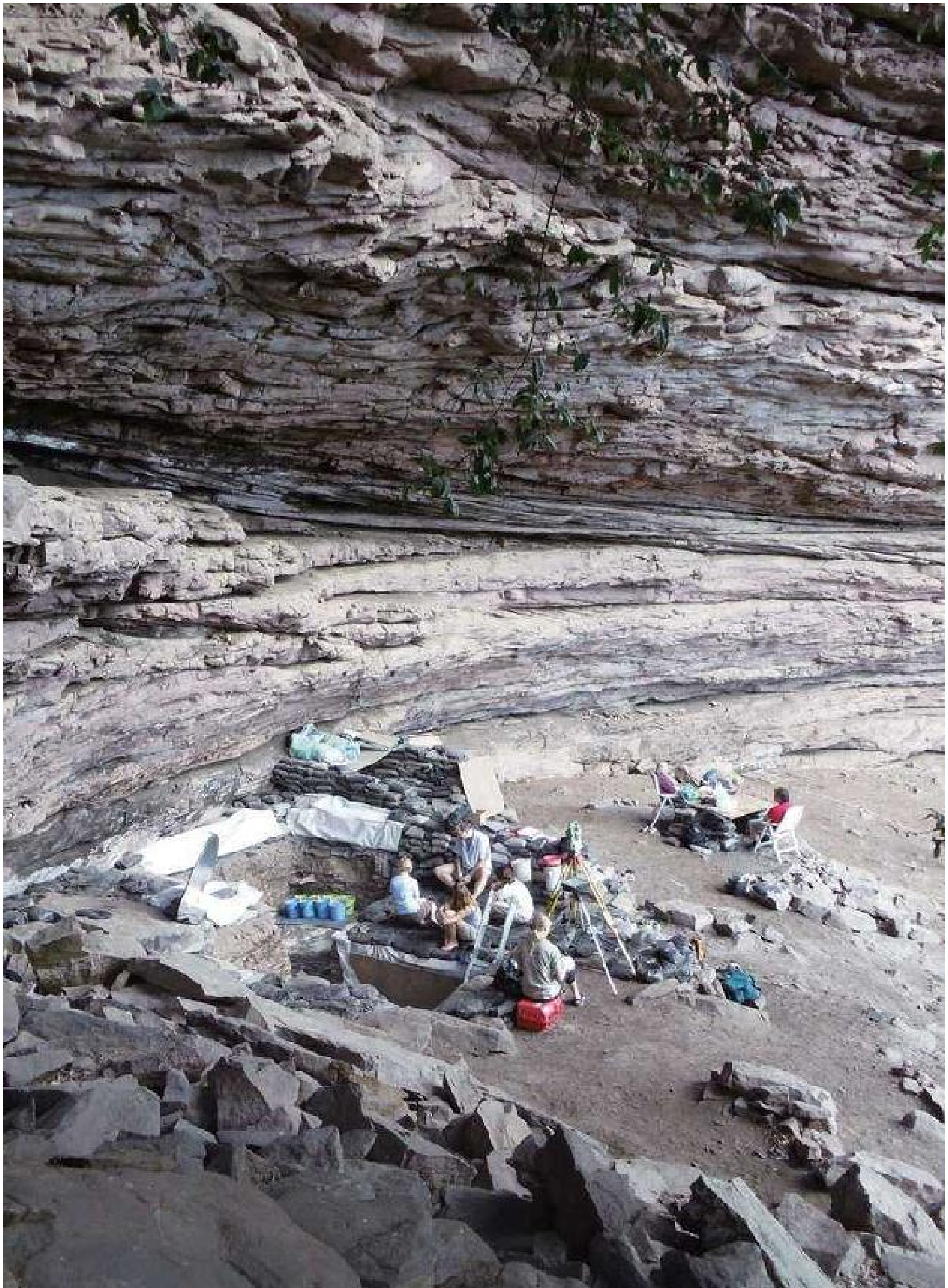
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[illegible]4-3 [illegible]Robert Kelly[illegible]

[illegible]——[illegible]——[illegible]

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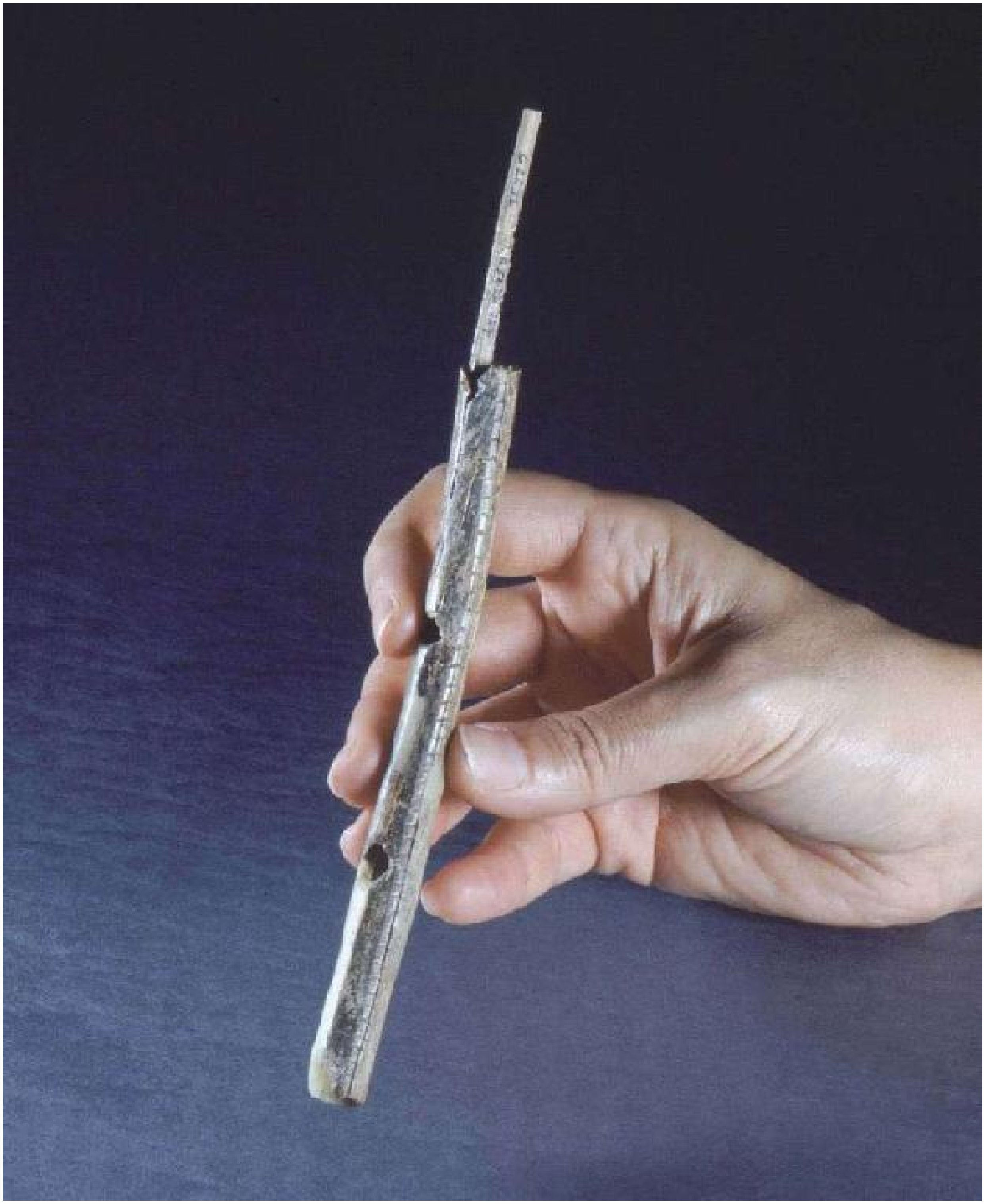


图4-4 □□□□□□□□□□□□□□□□□□42 000□□□Hilde Jensen□□□□□□□□□□□□

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[illegible]“[illegible]”[illegible]

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[illegible]“[illegible]”[illegible]·[illegible]Eric Smith[illegible][23][illegible]

[illegible][24][illegible]

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[illegible]20[illegible]5[illegible]



[illegible]4-5 [illegible]37 000[illegible]Hilde Jensen[illegible]



[illegible]4-6 [illegible]32 000[illegible]Juraj Lipták[illegible]

[illegible]·[illegible]Edward Hopper[illegible]*Night Hawks*[illegible][25][illegible]·[illegible]·[illegible]20[illegible]5[illegible]300[illegible]5[illegible]

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[1] [illegible]30[illegible]Brauer[illegible]2014[illegible]String[illegible]2014[illegible]16[illegible]“[illegible]”[illegible]“[illegible]”[illegible]20[illegible]

[2] Mithen[illegible]1996[illegible].

[3] [illegible]Kaminski[illegible]2014[illegible]

[4] Dunbar[illegible]2003[illegible].

[5] [illegible]Broca’s area[illegible]——[illegible]

[6] Steele, Ferrari and Fogassi□2012□; Sout and Chaminade□2012□.

[7] Barham□2013□;Ambrose□2010□; Wadley□2013□.

[8] Leacock□1969□.

[9] Howell□2010□.□□□□□□□□□□□□□□□□□□□□□□□□“□□□□”□Ju/’hoansi□□/□□Kung□□□□□□□□□□’□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[10] Altman□1987□.

[11] Stiner, Gopher and Barkai□2011□; Stiner□2013□.

[12] □□·□□□Pete Seeger□1919—2014□□□——□□□

[13] Henshilwood, d’Errico and Watts□2009□.

[14] Texier et al□2010□.

[15] □□Stiner□2014□□□□□□□□□□□□□□□□□□□“□□”□□19□□□□□□50□□□□□□□□□□□□□□□□□Joordens et al.□2015□□

[16] □□□□□□Baldwin effect□□□·□□□□1896□□□□□□□□□□□□□□□□——□□□

[17] Ambrose□2003□.

[18] Harpending and Rogers□2000□; Li and Durbin□2011□.□□□□□□□□□□□□□□□□□□□□

[19] Lewis-Williams□2002□.

[20] Dennett□2006□□Boyer□2001□□Boyer and Bergstrom□2008□□Atran□2002□□Dawkins□2006□.□□

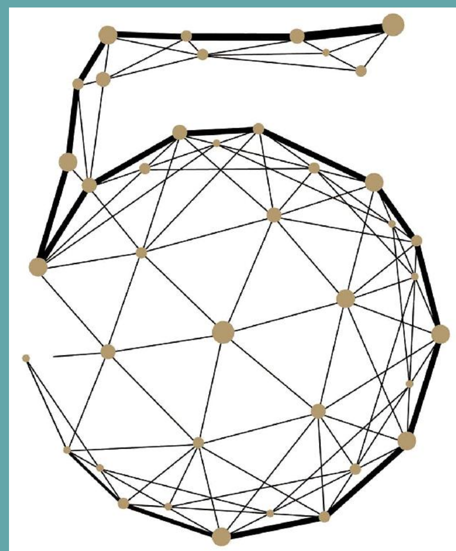
[21] Pettitt□2013□.

[22] Gargett et al□1989□□Sommer□1999□.□□□□□□□□□□□□□□□□□□Zihao□2015□□

[23] Smith□2004□.

[24] Wiessner□2002□.

[25] □□□·□□□1882—1967□□24□□□——□□□



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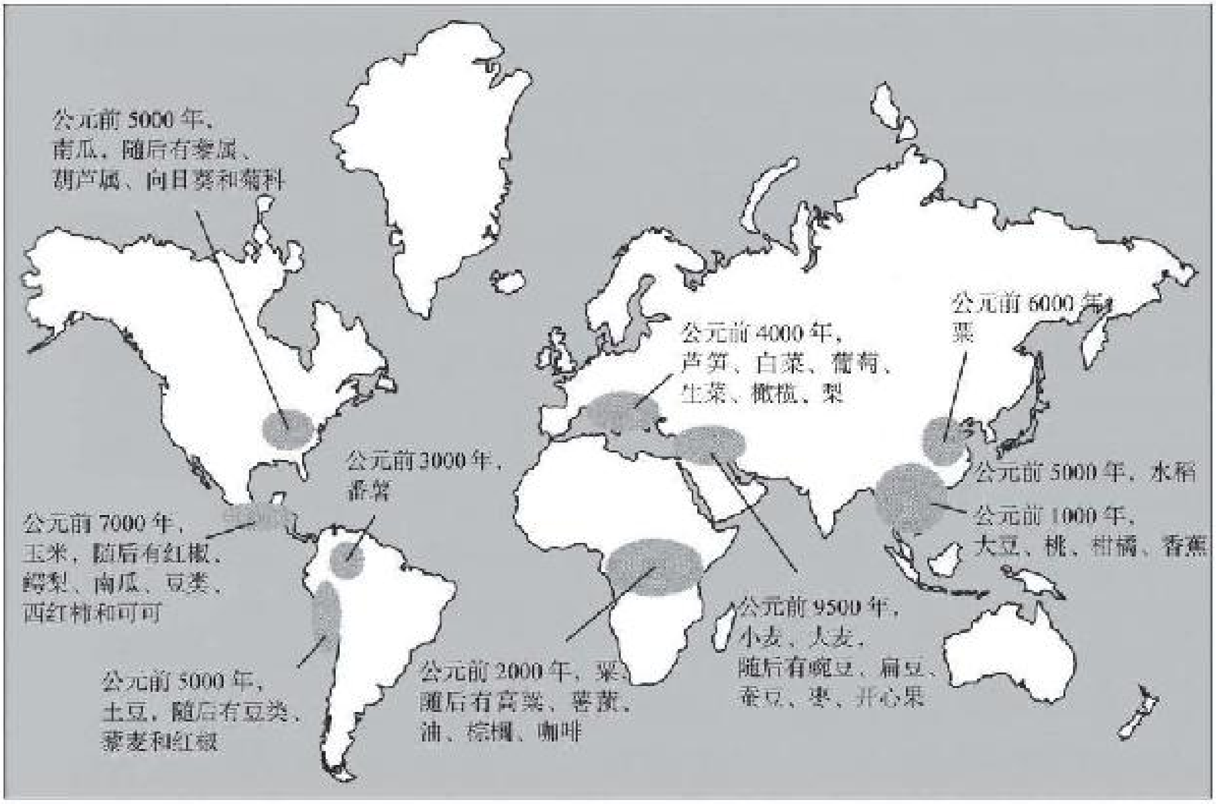
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公元前5000年、
南瓜，随后有藜属、
葫芦属、向日葵和菊科
公元前7000年，
玉米，随后有红椒、
鳄梨、南瓜、豆类、
西红柿和可可
公元前3000年，
番薯
公元前5000年，
土豆，随后有豆类、
藜麦和红椒
公元前2000年，粟，
随后有高粱、薯蓣、
油、棕榈、咖啡
公元前4000年，
芦笋、白菜、葡萄、
生菜、橄榄、梨
公元前9500年，
小麦、大麦，
随后有豌豆、扁豆、
蚕豆、枣、开心果
公元前6000年，
粟
公元前5000年，水稻
公元前1000年，
大豆、桃、柑橘、香蕉

□5-1 □□□□□□□□□□□□□□□□□□□□



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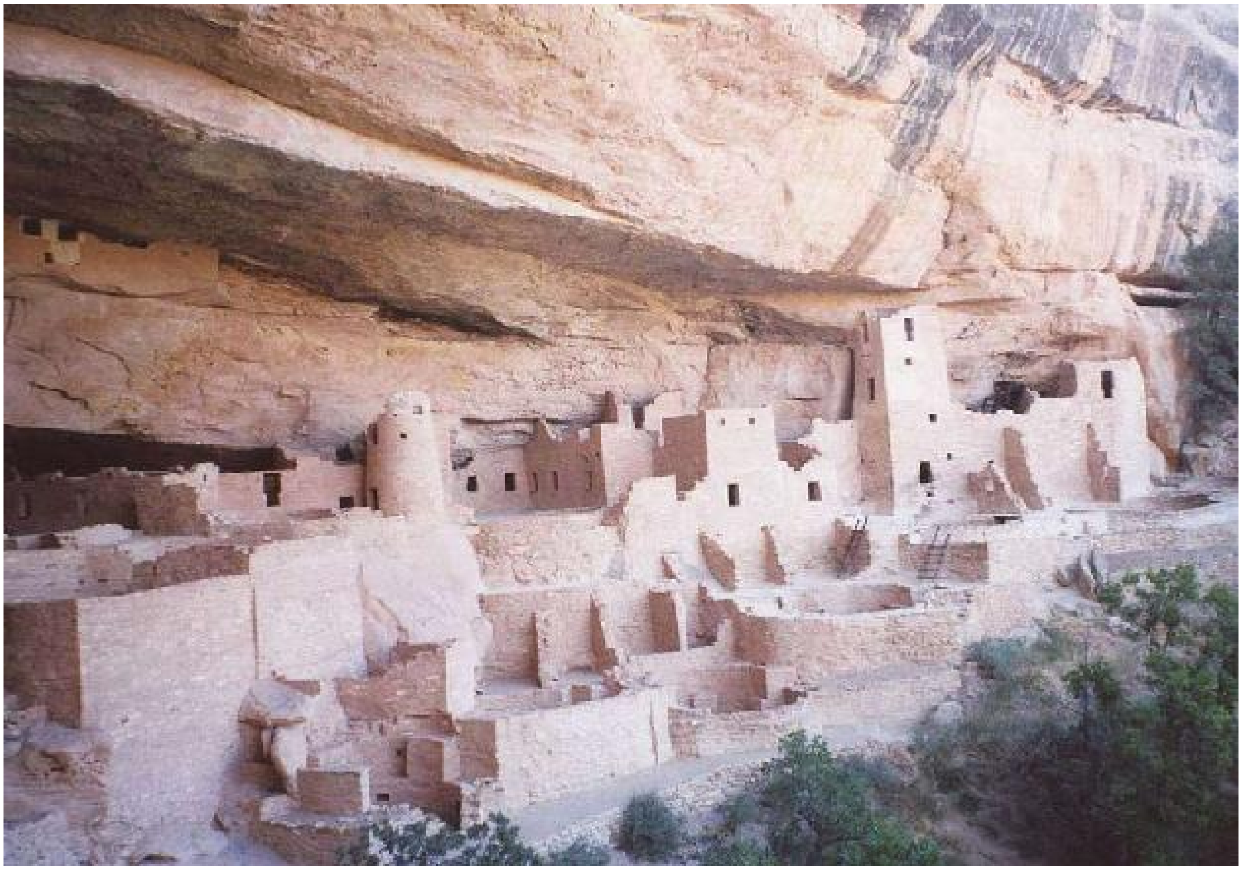
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[1] [illegible]Shipman[illegible]2015[illegible]Skoglund et al.[illegible]2015[illegible]

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[3] [illegible]2013[illegible]http://faostat3.fao.org/browse/Q/QC/E[illegible]

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[8] □□□Paisley Five-Mile□□□
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[15] Zahid, Robinson, and Kelly□2016□.□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
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Muschitiello et al.□2015□□Not and Hillaire-Marcel□2012□□

[18] □□□

[19] Doebley□2004□.

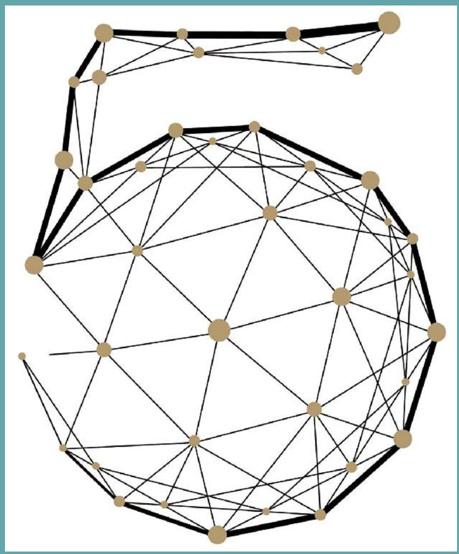
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[23] Bocquet-Appel[illegible]2015[illegible].

[24] [illegible]1000[illegible]



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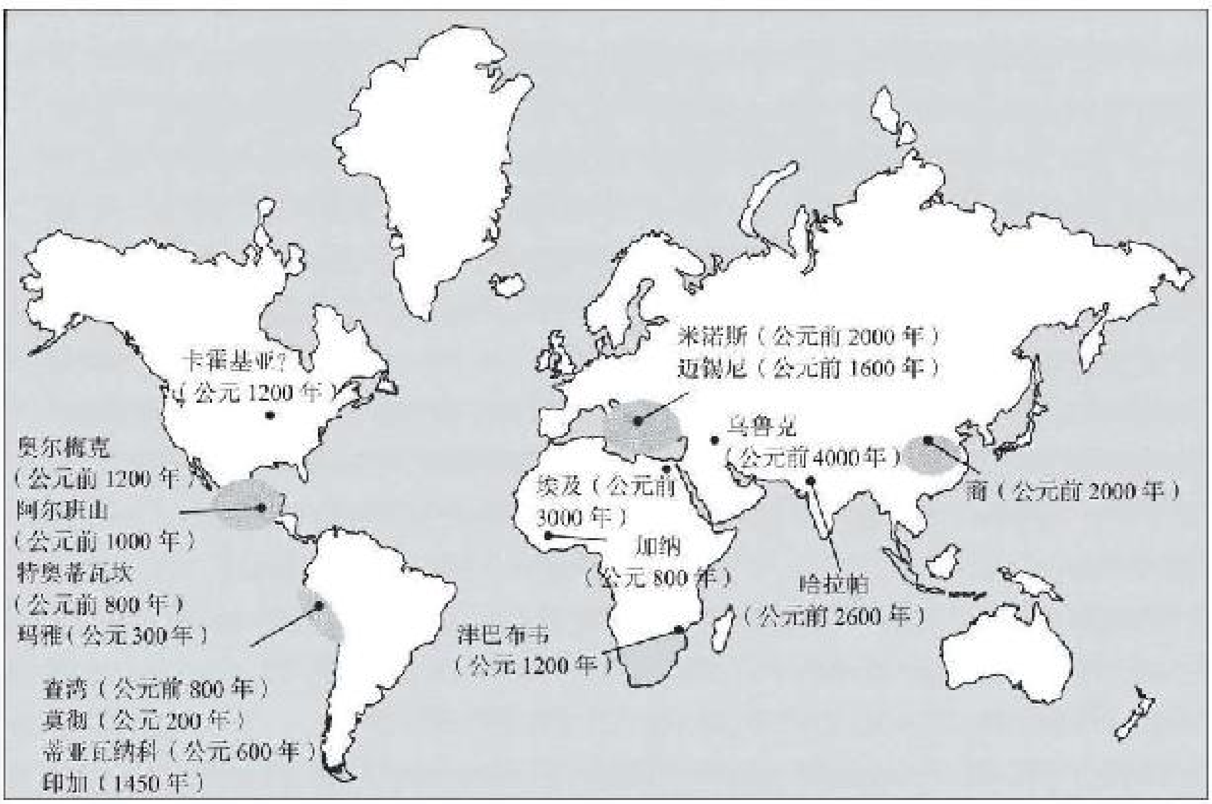
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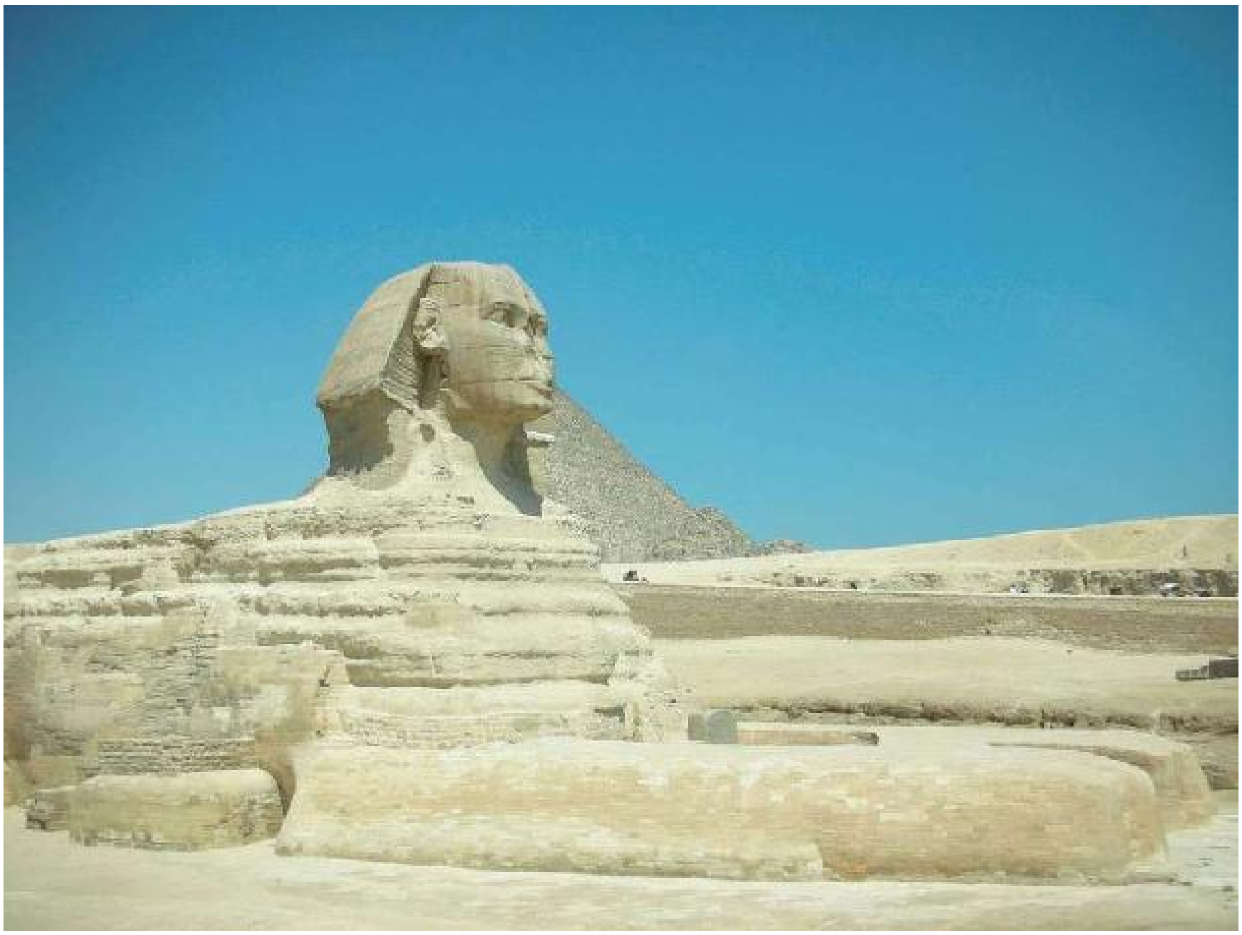
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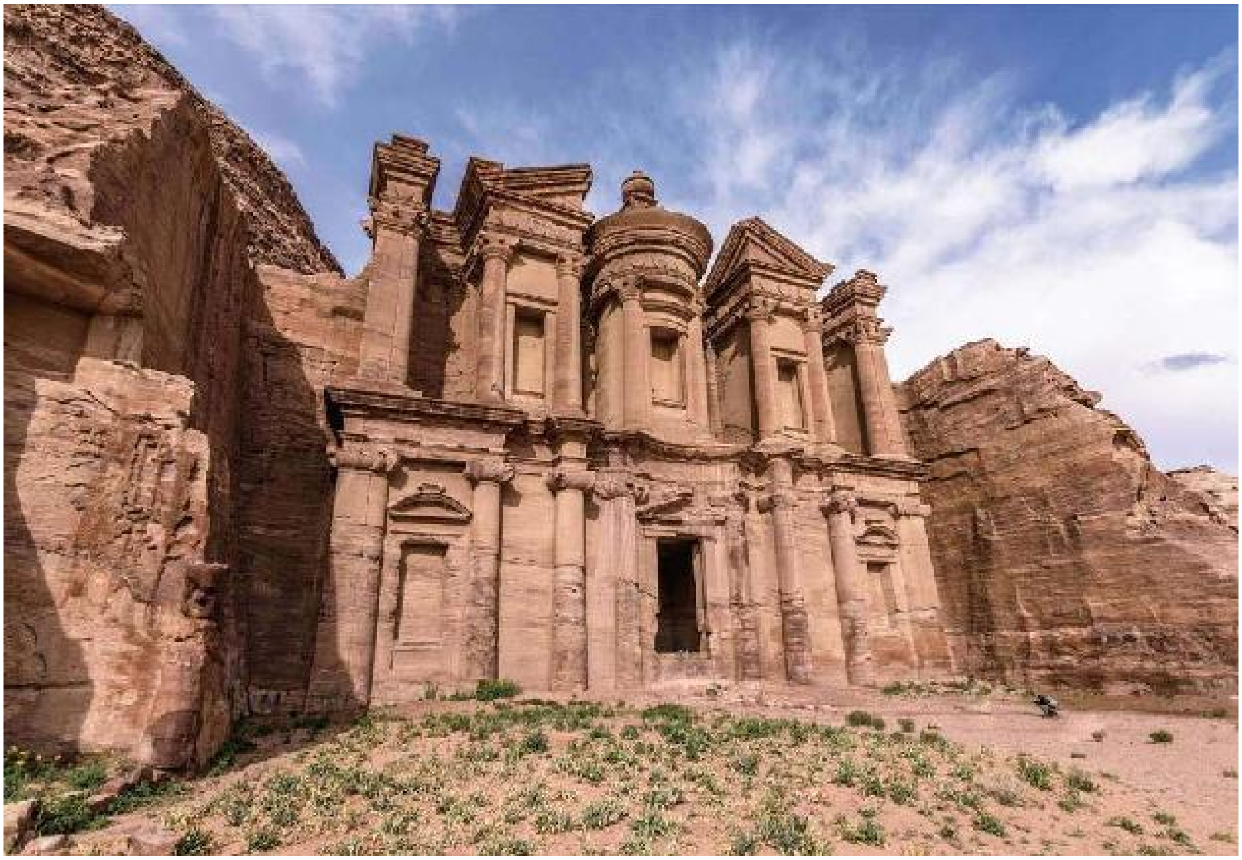
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[1] Fagan[illegible]1975[illegible].

[2] [illegible]1815[illegible]·[illegible]·[illegible]Giovanni Battista Belzoni[illegible]Ozymandias[illegible]——[illegible]Sekhmet[illegible]

[3] Roscoe[illegible]2009[illegible].

[4] Lehner[illegible]1997[illegible].[illegible]44°[illegible]52°[illegible]

[5] [illegible]

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[7] [illegible]40[illegible]

[8] Briggs□1970□.

[9] Fry□2007□.

[10] Ames and Maschner□1999□.

[11] Kelly□2013a□2013b□.[illegible]

[12] [illegible]

[13] Wendorf□1968□.[illegible]8000[illegible]Nataruk[illegible]Mirazon Lahr et al□2016□□

[14] Haas and Piscitelli□2013□.

[15] Ferguson□2013□.

[16] □□Allen and Jones□2014□□

[17] [illegible]Lee□1979□246[illegible]Codere□1950□120□□

[18] [illegible]20□□70[illegible]15□□□10[illegible]“□□”[illegible]

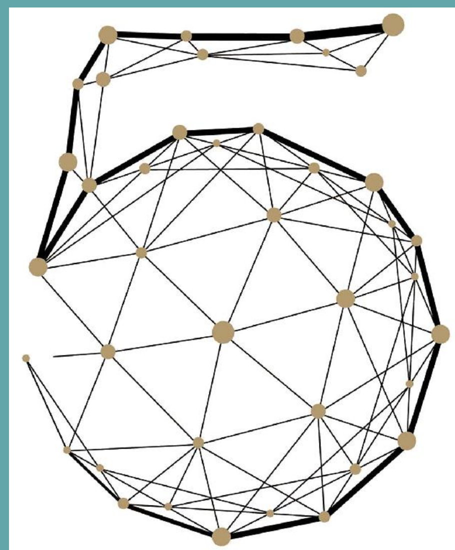
[19] Ember and Ember□1992□; Ember, Adem and Skoggard□2013□.

[20] Keith□2004[illegible]

[21] Atran□2010□.

[22] Flannery and Marcus□2012□.

[23] [illegible]



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[illegible]“[illegible]”[illegible]

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[illegible]1910[illegible]——[illegible]1947[illegible][4][illegible]“[illegible]”[illegible]——[illegible]6[illegible]

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[illegible]600[illegible]

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[illegible]21[illegible]500[illegible]

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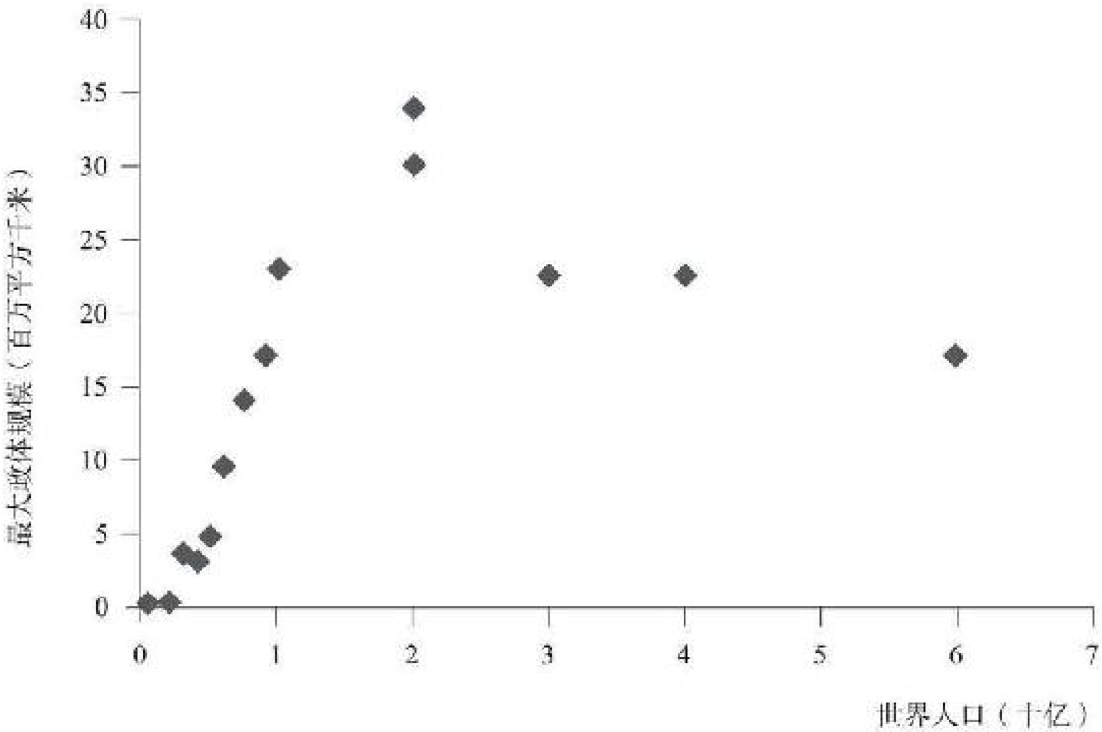
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[illegible]DNA[illegible]·[illegible]David Poyer[illegible]*Stepfather Bank*[illegible]·[illegible]Ray Kurzweil[illegible][10][illegible]

[illegible]

[illegible]——[illegible]·[illegible]Ray Bradbury[illegible]451°F[illegible]·[illegible]1984[illegible]·K.[illegible]Philip K. Dick[illegible]*Minority Report*[illegible][11][illegible]

[illegible]——[illegible]——[illegible][12][illegible]



[illegible]7-1 [illegible]3000[illegible]20[illegible]Y[illegible]
Carneiro 2004, Peregrine, Ember and Ember 2004, Taagepera 1978

[illegible]7-1[illegible]3 000[illegible]1.33[illegible]30[illegible]76[illegible]2020[illegible][13][illegible]

[illegible]20[illegible]196[illegible]

[illegible]21[illegible]300[illegible]3000[illegible]

[illegible]20[illegible]

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[illegible]



[illegible]7-2 2013[illegible]20[illegible]
[illegible]Robert Kelly[illegible]

[illegible]·[illegible][14][illegible]

[illegible]“[illegible]”[illegible]1500—1800[illegible]75%[illegible]35%[15][illegible]

[illegible]2015[illegible]1978[illegible][16][illegible]20[illegible]



[illegible]7-3 2016[illegible]Robert Kelly[illegible]

[illegible]19[illegible]20[illegible]1914[illegible]

[illegible][17][illegible][18][illegible]

[illegible]

[illegible]10[illegible][19]

[illegible]

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[illegible]5 000[illegible]

[illegible]1944[illegible]P-51[illegible]67.5[illegible][20][illegible]F-35[illegible]1.35[illegible]B-2[illegible]8[illegible]200[illegible]2[illegible][21][illegible]5[illegible]80[illegible]——[illegible][22]

[illegible]·[illegible]James Fallows[illegible]“[illegible]……[illegible]‘9·11’[illegible]‘[illegible]’[illegible]”[23][illegible]“[illegible]”[illegible]

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[illegible]——[illegible]

[illegible][25][illegible]

[illegible]2014[illegible]“[illegible]”[illegible]

[illegible]5 000[illegible]

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[illegible]2014[illegible]2016[illegible]“[illegible]”[illegible][26]

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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]vs[illegible]*Jihad versus Mcworld*[illegible]·[illegible]Benjamin Barber[illegible][28][illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible][29][illegible]1[illegible][30]

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[illegible]TPP[illegible]TTIP[illegible]

[illegible]

[illegible]1[illegible]“[illegible]”[illegible][32][illegible]

[illegible]

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[illegible]·[illegible]“[illegible]350[illegible]……[illegible]”[illegible]“[illegible]……[illegible]”[33][illegible]

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[illegible]

[illegible]—[illegible]2014[illegible]“[illegible]”[illegible]

[illegible]

[illegible]“[illegible]”[35]

• • •

[illegible]“[illegible]”[illegible]2015[illegible]·[illegible]Lisa Murkowski[illegible]“[illegible]”[36][illegible]

[illegible]“[illegible]”[illegible]H. V. [illegible]H.V. Evatt[illegible]“[illegible]”[37][illegible]—[illegible]

[illegible]1648[illegible]350[illegible]

[illegible]“[illegible]”[illegible]

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[illegible]

[illegible]5[illegible][38][illegible][39][illegible]

[illegible]—[illegible]——[illegible]2015[illegible]

[illegible]*The Parliament of Man*[illegible]·[illegible]Paul Kennedy[illegible]*Winning the War on War*[illegible]·[illegible]Joshua Goldstein[illegible][40][illegible]

2005[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]

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[illegible]——[illegible]

[illegible]“[illegible]”[illegible]1971[illegible]MBA[illegible]

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[illegible]·[illegible]·[illegible]·[illegible]·[illegible]Albert Schweitzer[illegible]2004[illegible]“[illegible]”[illegible]300[illegible]


WYOMING
ARCHAEOLOGICAL
SOCIETY

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[illegible]·[illegible]“[illegible]”[42][illegible]

[illegible]1995[illegible]Toliara[illegible]100[illegible]14[illegible]



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[illegible]21[illegible]“[illegible]”

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[illegible]

[illegible]—[illegible]1920[illegible]*Fire and Ice*[illegible]·[illegible]Robert Frost[illegible]

[illegible]“[illegible]”[illegible]

[illegible]

[illegible]

[1] [illegible]1858[illegible]

[2] [illegible]·[illegible]Paul Crutzen[illegible]“[illegible]”[illegible]Catastrophozoic[illegible]

[3] Steffen, Broadgate, et al.[illegible]2015[illegible]; Steffen, Richardson, et al.[illegible]2015[illegible].

[4] [illegible]20[illegible]50[illegible]20[illegible]80[illegible]

[5] [illegible]19[illegible]15[illegible]40%[illegible]50%——[illegible]—[illegible]——[illegible]“[illegible]”[illegible]

[6] [illegible]50%[illegible]

[7] Roser[illegible]2015[illegible].

[8] [illegible]·[illegible]Yogi Berra[illegible]·[illegible]Casey Stengel[illegible]·[illegible]·[illegible]Niels Bohr[illegible]

[9] [illegible]·[illegible]1971[illegible]·[illegible]Dennis Gabor[illegible]1963[illegible]“[illegible]”[illegible]

[10] [illegible]Ackerman[illegible]2014: 181[illegible]

[11] [illegible]

[12] Micklethwait and Wooldridge[illegible]2014[illegible]Waltz[illegible]1954[illegible]Peregrin, Ember and Ember[illegible]2004[illegible]Carneiro[illegible]2004[illegible]Graber[illegible]2004[illegible]Roscoe[illegible]2004[illegible]Taagepera[illegible]1978[illegible]

[13] [illegible]X[illegible]Y[illegible]1.33[illegible]X[illegible]

[14] [illegible]19[illegible]

[15] “[illegible]”（2014）。

[16] “[illegible]”（2014）[illegible]

[17] [illegible]1995[illegible]Zenith[illegible]2012[illegible]Element Electronics[illegible]

[18] Friedman（2005）.

[19] “[illegible]”（2015）。

[20] 1944[illegible]P-51[illegible]51 000[illegible]——[illegible]

[21] [illegible]1.6[illegible]4[illegible]6[illegible]

[22] [illegible]“9·11”[illegible]50%[illegible]13.5%[illegible]

[23] Fallows（2015）.

[24] Keegan（1993: 59）; Goldstein（2012）; Human Security Report Project（2011）.

[25] [illegible]49[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]——[illegible]

[26] [illegible]

[27] Armstrong（2014）.

[28] Barber（1996）.

[29] [illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[30] [illegible]Lyons（2015）。

[31] [illegible]Iriye（2002）[illegible]20[illegible]

[32] [illegible]“[illegible]”[illegible]——[illegible]——[illegible]——[illegible]——[illegible]——[illegible]Graber（2004）[illegible]

[33] Cartwright（2008: 49）.[illegible]“[illegible]”[illegible]

[34] Khanna（2011）[illegible]Davidson and Rees-Mogg（1997）[illegible]

[35] Khanna[illegible]2013: SR 5[illegible].

[36] “[illegible]”[illegible]2015[illegible]

[37] [illegible]“[illegible]”[illegible]http://en.wikipedia.org/wiki/sovereign_state[illegible]2015[illegible]1[illegible]13[illegible]

[38] [illegible]

[39] Hsiang et al[illegible]2011, 2013[illegible].

[40] Kennedy[illegible]2006[illegible]; Goldstein[illegible]2012[illegible].

[41] Ewing[illegible]2007: 35[illegible]2004[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[42] [illegible]“[illegible]”[illegible]

[43] [illegible]“[illegible]”[illegible]“[illegible]”[illegible]

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[illegible]·[illegible]Baker[illegible]2011[illegible]

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David Christian

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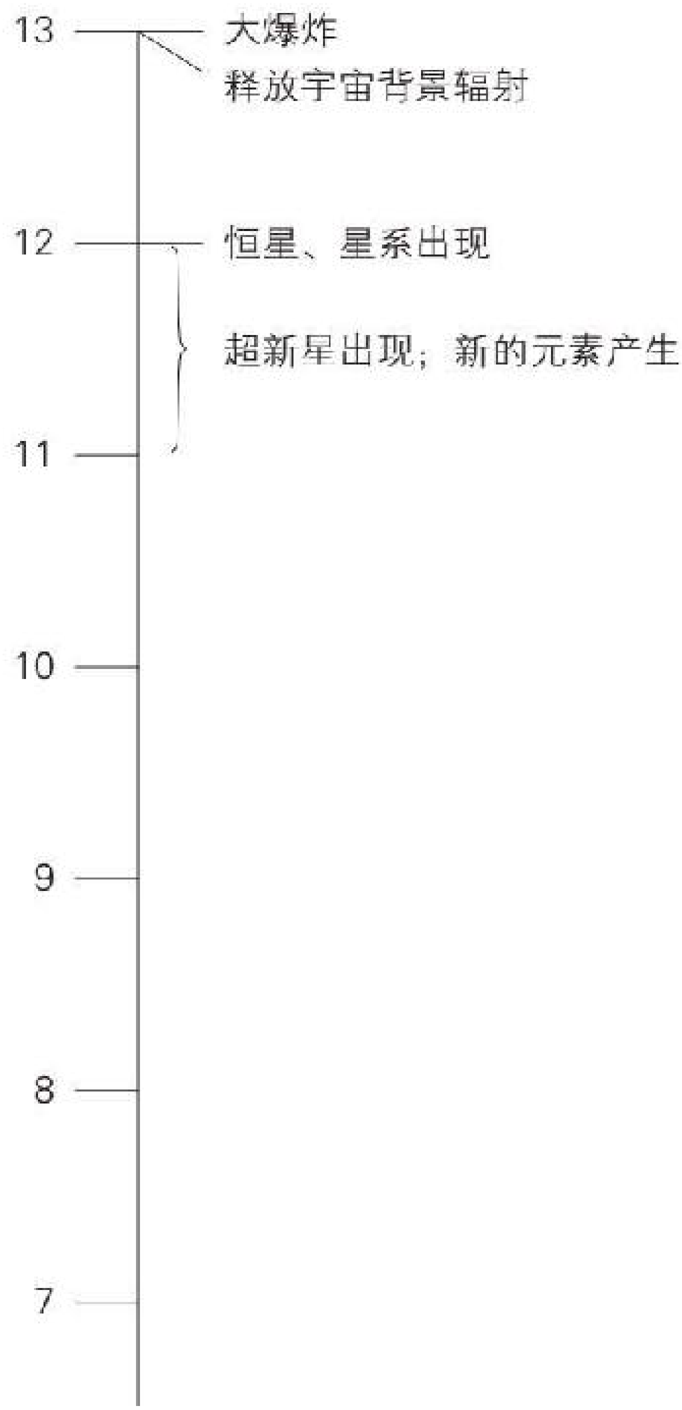
[17] [illegible]·[illegible]78[illegible]4[illegible]1992[illegible]3[illegible]1349[illegible]

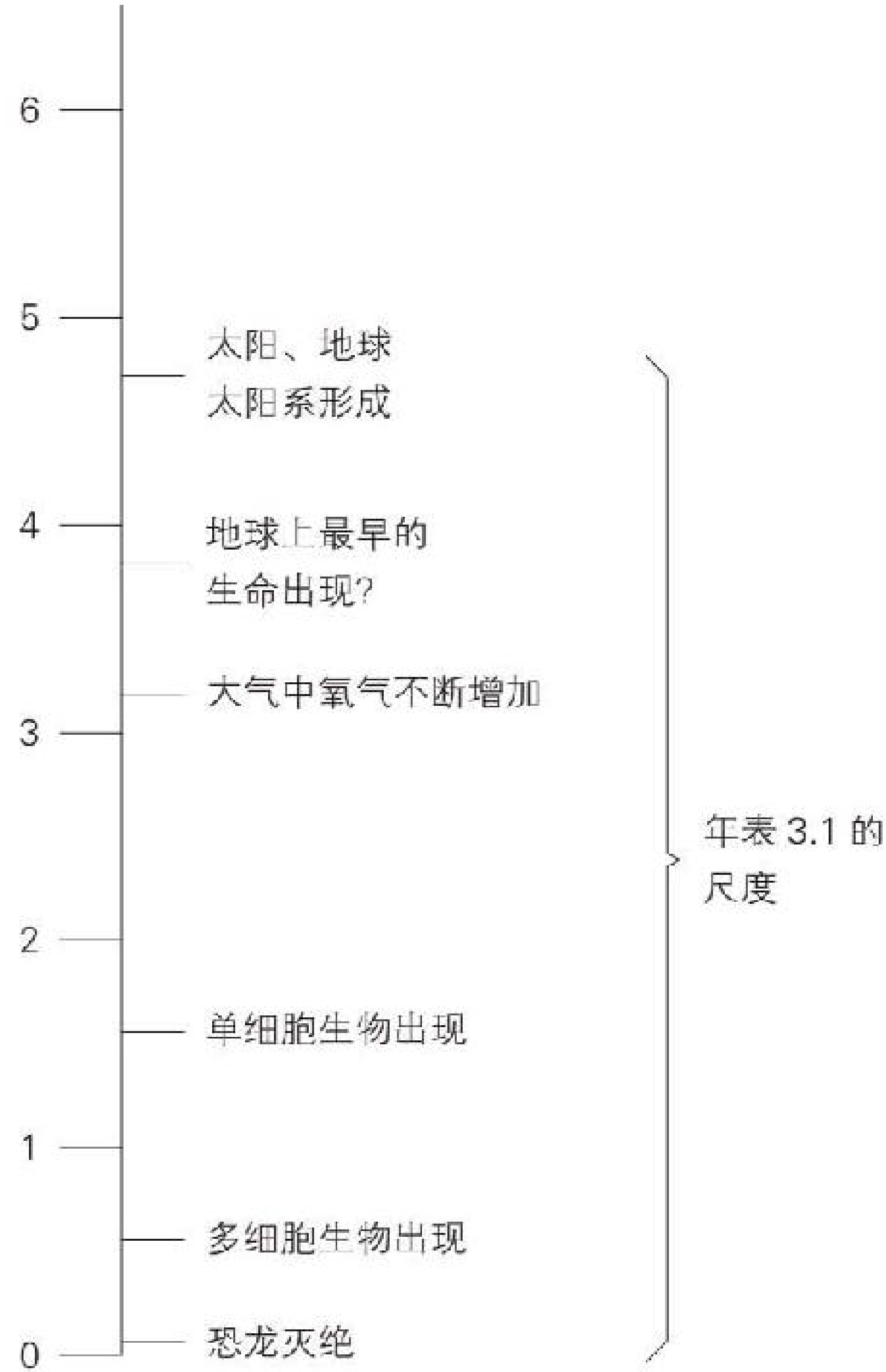
[18] [illegible]·[illegible]1991[illegible]12—13[illegible]

[19] [illegible]·[illegible]13[illegible]

[20] [illegible]instrumentalism[illegible]·[illegible]·[illegible]John Lewis Gaddis[illegible]2002[illegible]31—34[illegible]·[illegible]Stathis Psillos[illegible]1999[illegible]

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[illegible]


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大爆炸
释放宇宙背景辐射
12
恒星、星系出现
超新星出现；新的元素产生
11
10
9
8
7


6
5
太阳、地球
太阳系形成
4
地球上最早的
生命出现?
大气中氧气不断增加
3
年表 3.1 的
尺度
2
单细胞生物出现
1
多细胞生物出现
恐龙灭绝
0

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[illegible]30[illegible]

[illegible]

[illegible]Illyria[illegible][1]

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[illegible]

[illegible]subatomic particles[illegible]“[illegible]”[2]

[illegible]1200[illegible]*Rig-Veda*[illegible]

> [illegible][3]

[illegible]——[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]16[illegible]·[illegible]*Popol Vuh*[illegible]“[illegible]Maker[illegible]Modeler[illegible]Sovereign Plumed Serpent[illegible]Bearers[illegible]Begetters[illegible]quetzal[illegible]”[4][illegible]

[illegible]“[illegible]”[illegible]·[illegible]Marcel Griaule[illegible][5][illegible]Dogon[illegible]Ogotemmeli[illegible]“[illegible]……[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible][6][illegible]

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[illegible]

[illegible]Karraru[illegible]“[illegible]Nullarbor Plain[illegible]——[illegible]the Great Father Spirit[illegible]”[illegible][11][illegible]

[illegible]1988[illegible]·[illegible]“[illegible]”[12][illegible]“[illegible]”[illegible]

[illegible][13][illegible]·[illegible]Mircea Eliade[illegible]1954[illegible][14]

[illegible]·[illegible]Lee Smolin[illegible]“[illegible]”[illegible]algorithmic[illegible]“[illegible]”[illegible]2[illegible][15][illegible]“[illegible]”[illegible]multiverse[illegible]

[illegible]Lightfoot[illegible]“[illegible]”[illegible]4004[illegible]10[illegible]23[illegible]9[illegible]00[illegible][16][illegible]——[illegible]

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[illegible]18[illegible]

[illegible]——[illegible]1610[illegible]·[illegible]“[illegible]”[illegible]Olber’s paradox[illegible]19[illegible]

[illegible]19[illegible]

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[illegible]20[illegible]

[illegible]emergence myth[illegible]1927[illegible]“·[illegible]Georges Lemaoître[illegible]”[illegible]primordial atom[illegible]20[illegible]

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[illegible]“[illegible]”[illegible][19]

[illegible]·[illegible]（Richard Feynman）[illegible][20][illegible]——[illegible]“[illegible]/[illegible]”[illegible][21][illegible]10^{-34}[illegible]10^{-32}[illegible]30[illegible]“[illegible]”（antigravity）[illegible]·[illegible]“[illegible]”[22]

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[illegible]“[illegible]”[illegible]·[illegible]“[illegible]‘[illegible]’[illegible]”[illegible][24]

[illegible]30[illegible]4000℃[illegible][25][illegible]100℃[illegible]——[illegible]——[illegible]

[illegible]——[illegible]——[illegible]“[illegible]”[illegible][26]

[illegible]·[illegible]“[illegible]”[27][illegible]30[illegible]

[illegible]1.1[illegible]30[illegible]

[illegible]130[illegible]

[illegible]1.1 [illegible]

距离大爆炸的时间	大事记
10^{-43} 秒	“普朗克时间”；宇宙小于物理意义上的最小的长度单位“普朗克长度”；在此之前所发生的事情我们无法说明，但是作为基本力之一的引力已经出现了。
10^{-35} 秒	“强”“电磁”力作为不同的基本力开始出现。
10^{-33}—10^{-32} 秒	“膨胀”：宇宙以超光速的速度扩张，温度下降至接近绝对零度。
大约 10^{-10}—10^{-6} 秒	当基本力彼此单独分离，宇宙温度再次升高；夸克和反夸克相互创造和消亡；继续存在的夸克局限于质子和中子（它们的总和只不过是原先夸克和反夸克总和的十亿分之一）。
1—10 秒	正负电子相互结对并且消亡（残留下来的也许只是原先正负电子总和的十亿分之一）。
3 分钟	质子和中子结合成氢和氦的原子核。
30 万年	带负电荷的原子被带正电荷的中子捕获；宇宙在电价上变为中性，而且放射线和物质彼此分离；在至今仍能察觉到的巨大“闪光”中，放射线以背景微波射线的形式被释放出来。

[illegible]·[illegible]Cesare Emiliani[illegible]2[illegible]·[illegible]1995[illegible], [illegible]82[illegible]·[illegible]2001[illegible]78[illegible]

[illegible]“[illegible]”[28][illegible]

[illegible]·[illegible]1584[illegible]“[illegible]”[29][illegible]

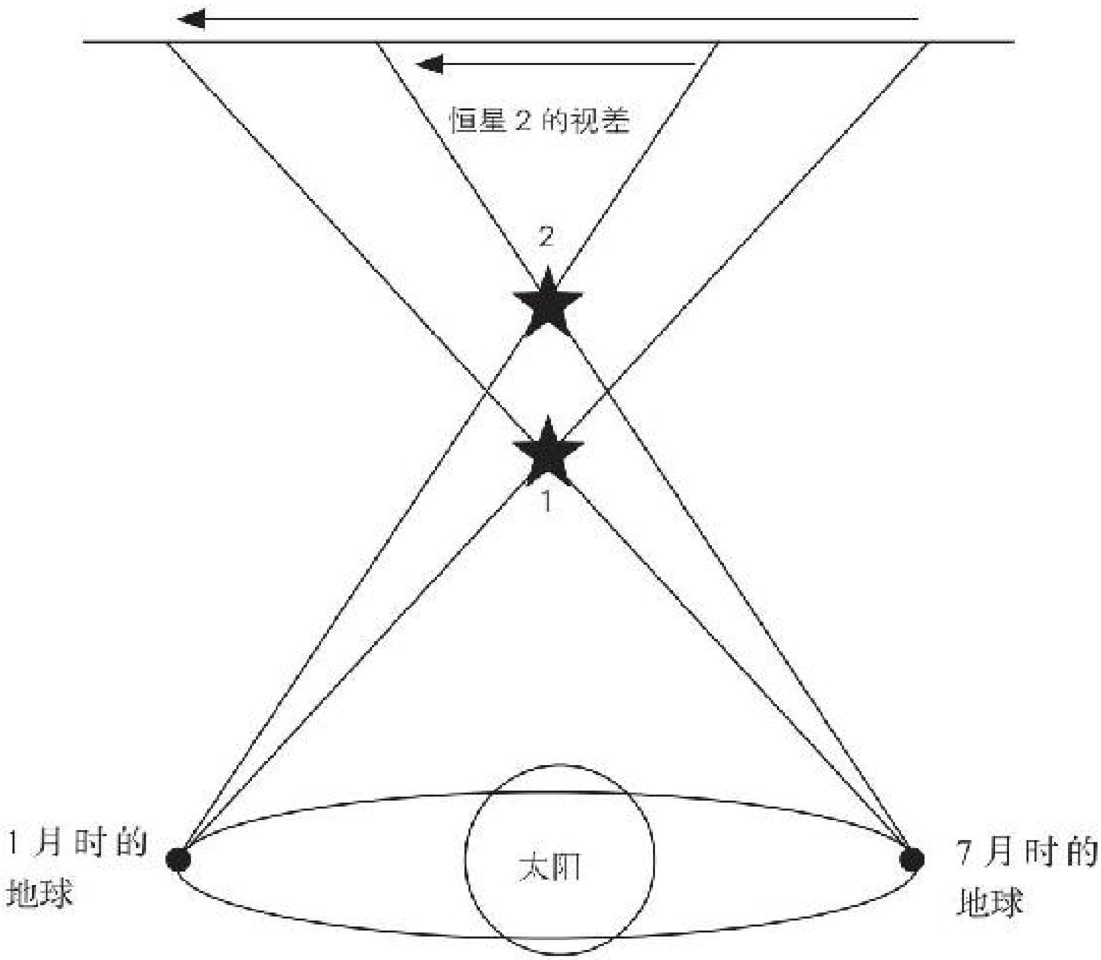
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[illegible]6[illegible]·[illegible]Ken Croswell[illegible]“[illegible]”[illegible]1999[illegible]——[illegible]1996[illegible]16[illegible]

[illegible]20[illegible]10[illegible]·[illegible]Henrietta Leavitt[illegible]——[illegible]“[illegible]”[illegible]

20[illegible]20[illegible]·[illegible]Edwin Hubble[illegible]·[illegible]1924[illegible]20[illegible]20[illegible]90%[illegible]

[illegible]2[illegible]

[illegible]——[illegible]

[illegible]

[illegible] 100 [illegible] 500 [illegible]/[illegible] 100 [illegible] 326 [illegible] 30.9×10^{18} [illegible] 3000 [illegible] 20 [illegible] 55—75 [illegible]/[illegible]·[illegible] 100 [illegible] 160 [illegible] 130 [illegible][30] [illegible]

[illegible]

20 [illegible] —— [illegible] “[illegible]” [illegible] 1922 [illegible]·[illegible] Alexander Friedmann [illegible]

[illegible]20[illegible]40[illegible]20[illegible]40[illegible]60[illegible]60[illegible]20[illegible]40[illegible]——[illegible]·[illegible]George Gamow[illegible]——[illegible]·[illegible]Fred Hoyle[illegible]

[illegible]

[illegible]Cosmic Background Radiation[illegible]CBR[illegible]

[illegible]·[illegible]Arno Penzias[illegible]·[illegible]Robert Wilson[illegible]1964[illegible]“[illegible]”[illegible]——[illegible]——[illegible]P. J. E.[illegible]P. J. E. Peebles[illegible]3℃[illegible]

[illegible]1965[illegible]

[illegible]·[illegible]Max Tegmark[illegible]“[illegible]DNA[illegible]”[31][illegible] 2001[illegible]6[illegible]the Wilkinson Microwave Anisotropy Probe[illegible]WMAP[illegible][32]

[illegible]

[illegible]CBR[illegible]76%[illegible]24%[illegible]71%[illegible]28%[illegible]2[illegible]3[illegible]·[illegible]·[illegible]“[illegible]”[33][illegible]

[illegible]120[illegible]120[illegible]

[illegible]——[illegible]——[illegible]100[illegible]100[illegible]2[illegible]

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[illegible]

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[illegible]1000[illegible][35]100[illegible]10[illegible]10[illegible]10[illegible]100[illegible]10^2[illegible]1000[illegible]10[illegible]10^3[illegible]1[illegible]1[illegible]0[illegible]

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[illegible]·[illegible]Barbara Sproul[illegible]1991[illegible]·[illegible]Stephen Hawking[illegible]1988[illegible]2001[illegible]·[illegible]Steven Weinberg[illegible]1993[illegible]2[illegible]·[illegible]John Gribbin[illegible]1981[illegible]·[illegible]Timothy Ferris[illegible]1997[illegible]·[illegible]John Barrow[illegible]1994[illegible]·[illegible]Peter Coles[illegible]2001[illegible]·[illegible]Armand Delsemme[illegible]1998[illegible]·[illegible]Cesare Emiliani[illegible]1995[illegible]·[illegible]Eric Chaisson[illegible]2001[illegible]·[illegible]Martin Rees[illegible]2000[illegible]·[illegible]Lee Smolin[illegible]1998[illegible]·[illegible]Charles Lineweaver[illegible]2002[illegible]·[illegible]Nigel Calder[illegible]1983[illegible]

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[4] □□□·□□□□□Dennis Tedlock□□□□□□□□□□□·□□□□□□□□ □□□□□□□□□□□□□□1996□□□□64□□

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[30] □□·□□□□□Wendy L. Freedman□□□□□□□□□□□□□□□□□□□□□□□1998□□□□□□92—97□□□·□□□□□□Ken Croswell□□□□□□□□□□□□□□□□□□1998□5□30□□□42—46□□□□□□□□□□□□□□□□□□32□□□2□□

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[33] □□·□□□□□□□□□·□□□□□□□□□□□□□□□40□□□□□41□□

[34] □□·□□□□Peter Coles□□□□□□□□□□□□□□□□□□□□□□□2001□□□□91—92□□□□□□□□□□□□□□□□96—99□□□□□□□□□□“□□□”□□□□

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[illegible]2[illegible]
[illegible]

[illegible]

> [illegible]“[illegible]”[illegible]“[illegible]100[illegible]”[illegible][1]

[illegible]galaxies[illegible]1000[illegible]Milky Way[illegible]group[illegible]20[illegible]cluster[illegible]2000[illegible]supercluster[illegible]1[illegible]1[illegible]20[illegible]80[illegible]

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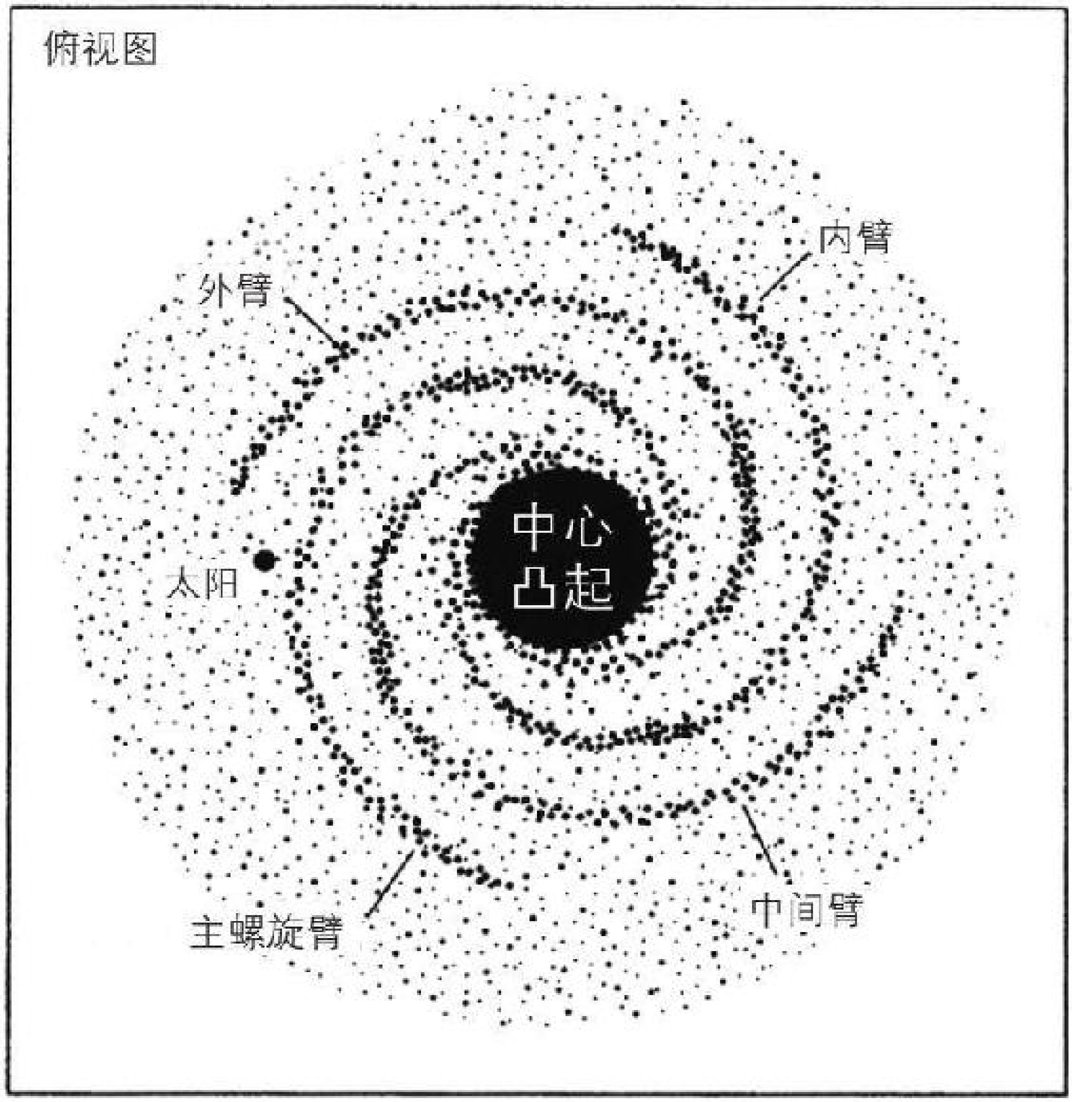
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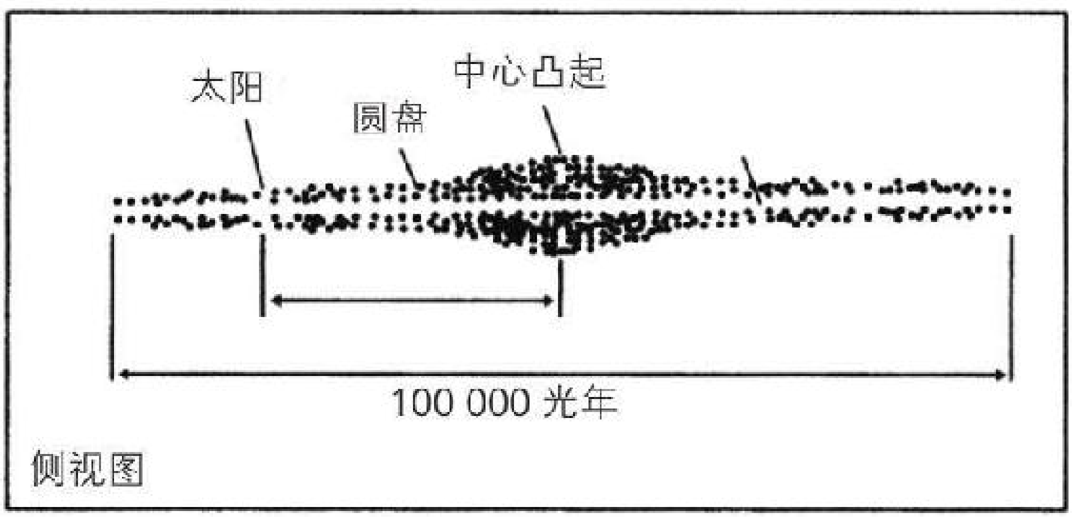
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[illegible]


俯视图
内臂
外臂
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凸起
太阳
主螺旋臂
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中心凸起
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100 000 光年
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[illegible]2.1 [illegible]

[illegible]27000[illegible]·[illegible]2000[illegible]97[illegible]

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[illegible]——[illegible]17[illegible]20[illegible]1919[illegible]

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[illegible]

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[illegible]27000[illegible]A[illegible]250[illegible]

[illegible]——[illegible]quasar[illegible]“[illegible]”[illegible]quasistellar radio source[illegible]1962[illegible]100[illegible]20[illegible]“[illegible]”[illegible]

[illegible]

[illegible] 10% [illegible] 1% [illegible] 10 [illegible] dark matter [illegible]

[illegible] “[illegible]” [illegible] WIMP [illegible] neutrino [illegible] 1/500000 [illegible] 10 [illegible] “[illegible]” [illegible] MACHO [illegible] dark energy [illegible] 70% [illegible]/[illegible] vacuum energy [illegible] 20 [illegible] 90 [illegible] 25% [illegible] 5%[illegible][8]

[illegible]

[illegible]

20[illegible]

[illegible]8%[illegible]brown dwarf[illegible]——[illegible]

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[illegible]10[illegible]3000[illegible]2[illegible]1/10[illegible]

[illegible]1[illegible]26[illegible]

40[illegible]——60[illegible]

[illegible]50[illegible]

[illegible]8[illegible]supernova[illegible]1000[illegible]30[illegible]neutron star[illegible]600[illegible]1967[illegible]pulsar[illegible]30[illegible]1054[illegible]

[illegible]30[illegible]1987[illegible]2[illegible]1604[illegible]1987[illegible]-69 202[illegible]Sanduleak-69 202[illegible]

[illegible]40[illegible]16[illegible]16[illegible]“[illegible]”[illegible][10]

[illegible]Ia[illegible]Ia supernova[illegible]

[illegible]6[illegible]26[illegible]

[illegible]200[illegible]

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[illegible]2.7[illegible]40%[illegible]

[illegible]98%[illegible]72%[illegible]27%[illegible]1.4%[illegible]0.5%[illegible]10[illegible]0.03%[illegible][11][illegible]3[illegible]

[illegible]G2[illegible]95%[illegible][12][illegible]140[illegible]4[illegible]46[illegible]40[illegible]——50[illegible]1/3[illegible]150[illegible]100[illegible]6000[illegible]100[illegible]subatomic particle[illegible]8[illegible]1.5[illegible]

[illegible]

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[illegible] 10 [illegible] 36 [illegible] 10^{36} [illegible][13] [illegible]

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[illegible] 5—6 [illegible] 747 [illegible] 900 [illegible] 20 [illegible] 1.5 [illegible]

[illegible]500[illegible]1000[illegible]8[illegible]4[illegible]4[illegible]3[illegible]1[illegible]

[illegible]

[illegible]2500[illegible][16][illegible]

[illegible]

[illegible]30[illegible]10[illegible]

[illegible]

[illegible]

[illegible]·[illegible]1996[illegible]·[illegible]1988[illegible]·[illegible]1998[illegible]·[illegible]1995[illegible]2[illegible]·[illegible]Isaac Asimov[illegible]·[illegible]1981[illegible]·[illegible]2000[illegible]·[illegible]1998[illegible]2001[illegible]·[illegible]·[illegible]2002[illegible]“[illegible]”[illegible]

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[2] [illegible]·[illegible]1997[illegible]151—152[illegible]

[3] [illegible]5[illegible]“[illegible]”[illegible]6[illegible]0.005%[illegible]0.3%[illegible]5%[illegible]“[illegible]”[illegible]25%[illegible]70%[illegible]“[illegible]”[illegible]·B. [illegible]David B. Cline[illegible]2003[illegible]3[illegible]50—59[illegible]53[illegible]

[4] [illegible]NASA[illegible]2003[illegible]2[illegible]WMAP[illegible]2[illegible]2003[illegible]2[illegible]12[illegible]http://imagine.gsfc.nasa.gov/docs/features/news/12febo3.html[illegible]2003[illegible]4[illegible]

[5] [illegible]53[illegible]100%[illegible]

[6] [illegible]79—80[illegible]

[7] [illegible]·[illegible]1998[illegible]7[illegible]“[illegible]”“[illegible]”[illegible]·[illegible]Henry Plotkin[illegible]1997[illegible]251—252[illegible]

[8] [illegible]·[illegible]·[illegible]2002[illegible]95[illegible]

[9] [illegible]·[illegible]·[illegible]John Wilford Noble[illegible]2001[illegible]6[illegible]8[illegible]21[illegible]

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[12] [illegible]·[illegible]Ken Croswell[illegible]1996[illegible]47—48[illegible]

[13] [illegible]1999[illegible]49[illegible]

[14] [illegible]20[illegible]90[illegible]·[illegible]David Allen[illegible]

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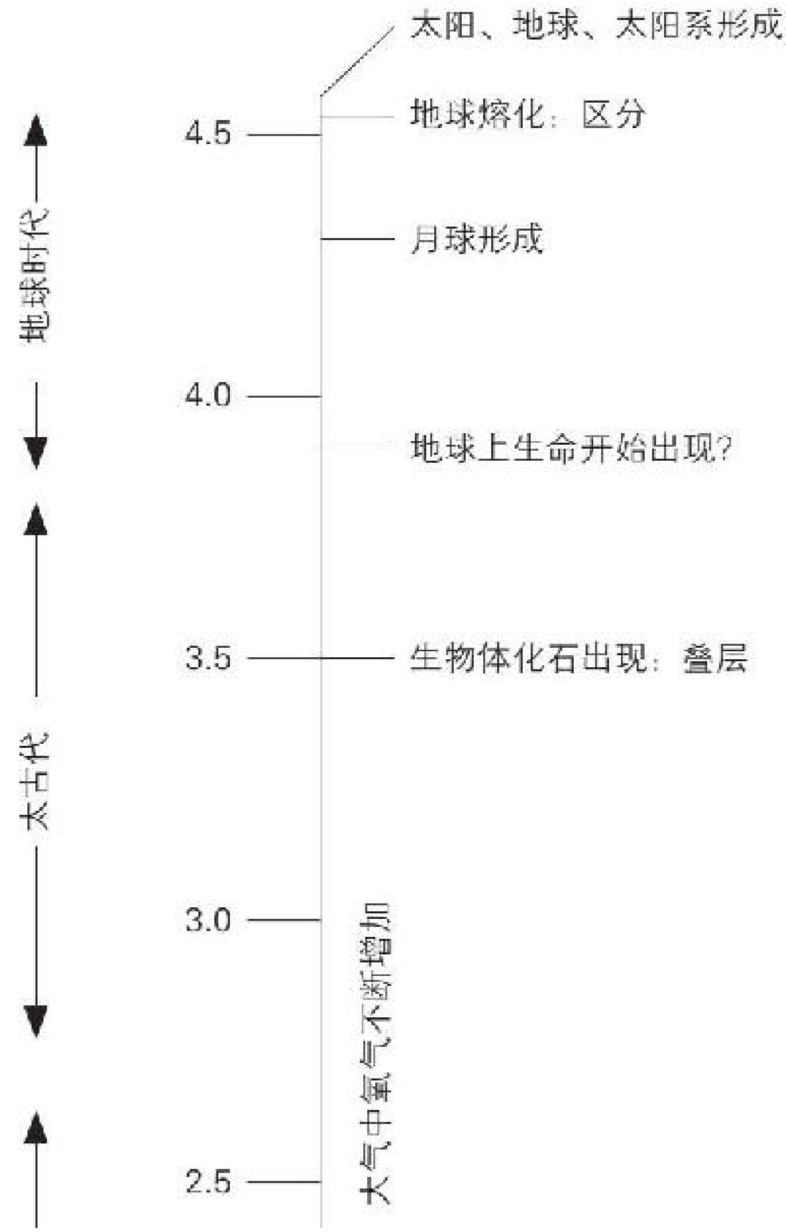
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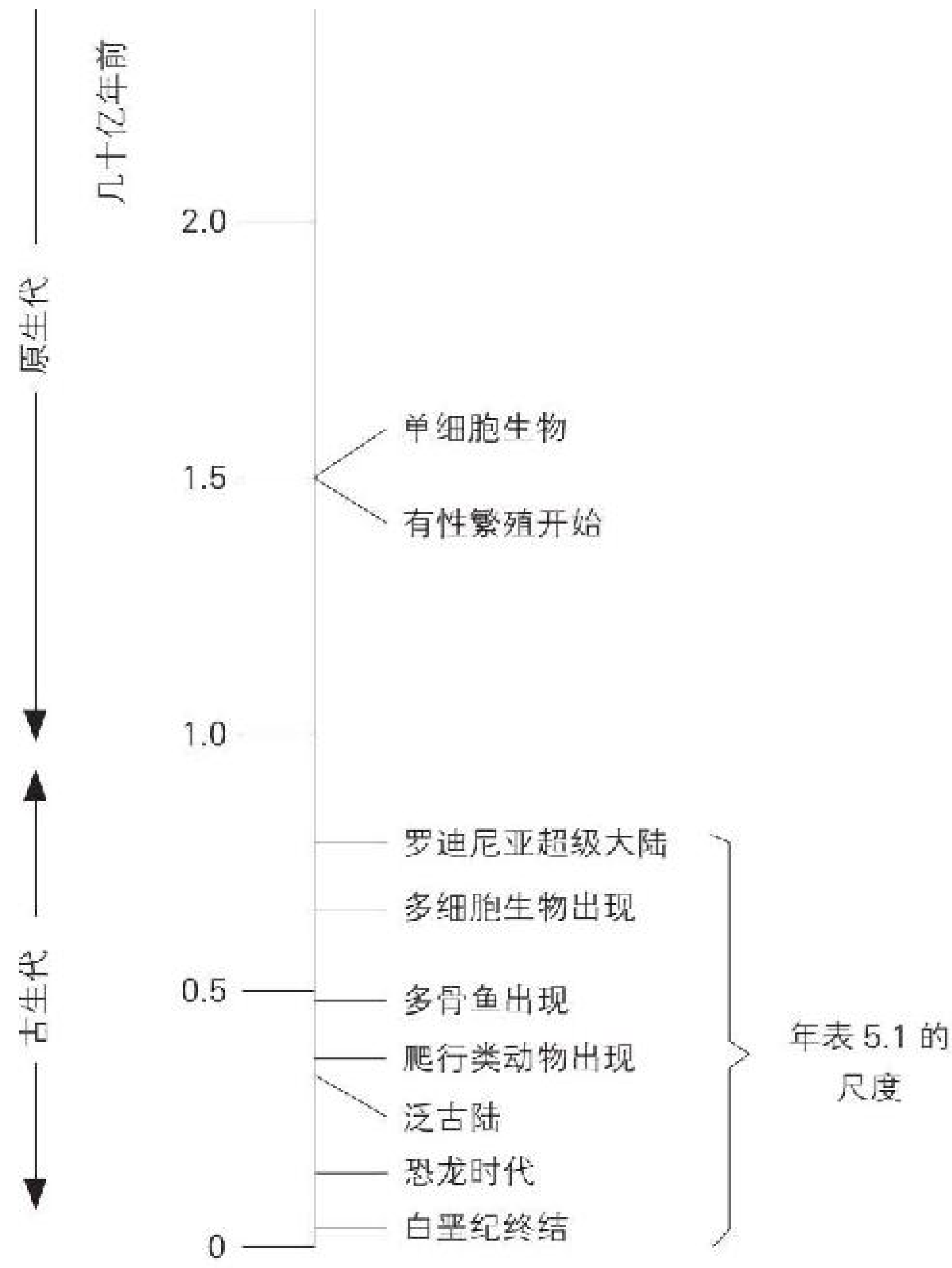
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[illegible]20[illegible]60[illegible]

[illegible]

[illegible]45.6[illegible]1/3[illegible]


太阳、地球、太阳系形成
4.5
地球熔化：区分
地球时代
月球形成
4.0
地球上生命开始出现?
3.5
生物体化石出现：叠层
太古代
3.0
大气中氧气不断增加
2.5



[illegible]3.1 [illegible]“[illegible]”[illegible]45[illegible]

[illegible]99.9%[illegible]0.1%[illegible]59[illegible]10[illegible]

[illegible]20[illegible]90[illegible]98%[illegible]

[illegible]300[illegible]1/1000[illegible]100[illegible]“[illegible]”[illegible]3[illegible]/[illegible]2[illegible]/[illegible]

[illegible]——[illegible]accretion[illegible]1755[illegible]10[illegible]10[illegible]Oort cloud[illegible]35[illegible]Chiron[illegible]200[illegible]

[illegible]10[illegible]T[illegible]T Tauri wind[illegible]T[illegible]100[illegible]30[illegible]

[illegible]

[illegible]50%[illegible]19%[illegible]14%[illegible]12.5%[illegible]“[illegible]”[illegible]5000[illegible][1][illegible]

[illegible]

[illegible]1995[illegible]6[illegible]70[illegible]1998[illegible]5[illegible]——[illegible]3[illegible]——[illegible][2][illegible]10%[illegible]4[illegible]

[illegible]

[illegible] 10 [illegible] “[illegible]” [illegible]
A1 [illegible] 10 [illegible]

[illegible]

[illegible] differentiation [illegible] 4000 [illegible]

[illegible] 3000 [illegible] 35 [illegible] 7 [illegible] 6400 [illegible] 1/200 [illegible] 38 [illegible]

[illegible]

[illegible]CO2[illegible]35[illegible]100℃[illegible]

[illegible]——[illegible][3][illegible]5[illegible]

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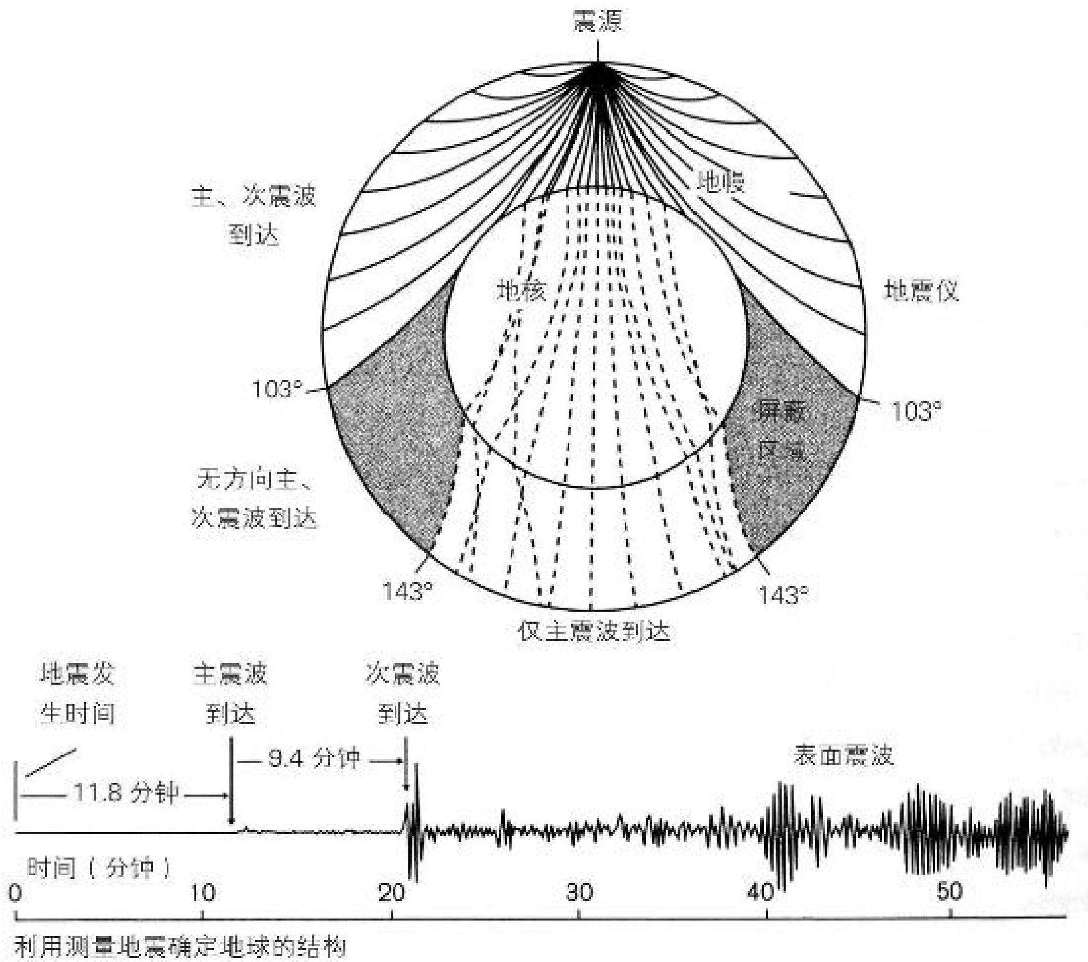
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[illegible]6000[illegible]

[illegible]20[illegible]

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[illegible]

[illegible]

20[illegible]60[illegible]60[illegible]

[illegible]6000[illegible]17[illegible]·[illegible]Nicholas Steno[illegible]

[illegible]6000[illegible]19[illegible]

[illegible]18[illegible]19[illegible]·[illegible]Charles Lyell[illegible]uniformitarianism[illegible]volcanic activity[illegible]1830[illegible]

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20[illegible]60[illegible]·[illegible]Harry Hess[illegible]spreading margin[illegible]

[illegible] 3 [illegible] 1.5 [illegible]

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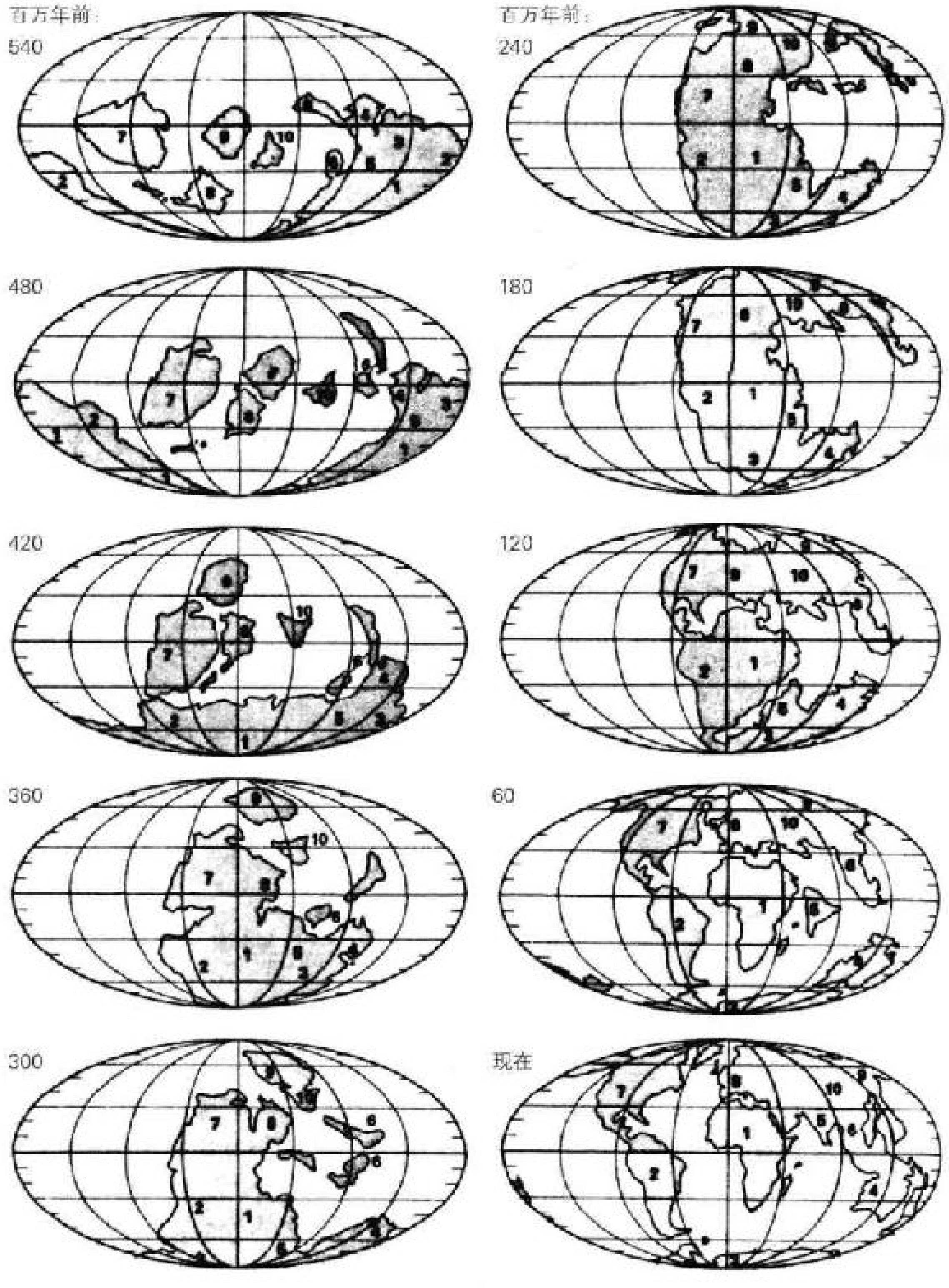
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[illegible]2.5[illegible]“[illegible]”[illegible]“[illegible]”[illegible]2[illegible]Laurasia[illegible]Gondwanaland[illegible]5[illegible]Rodinia[illegible][7][illegible]3.1[illegible]

[illegible]5[illegible]

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[illegible]45.6[illegible]



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[illegible]40[illegible]20[illegible]60[illegible]

[illegible]

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[illegible]4[illegible]
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[illegible]·[illegible][2][illegible]4.1[illegible]“[illegible]”[illegible][3][illegible]

一般结构	自由能率密度 尔格 秒$^{-1}$ 克$^{-1}$（erg s^{-1} g^{-1}）
星系（例如银河系）	1
恒星（例如太阳）	2
行星（例如地球）	75
植物（生物圈）	900
动物（例如人类的身体）	20 000
大脑（例如人类的头盖骨）	150 000
社会（例如现代人类文化）	500 000

electromagnetism the nuclear forces

“ ”

——

· Charles Darwin

[illegible]“[illegible]”[illegible]natural selection[illegible]“[illegible]”[illegible]evolution[illegible]·[illegible]1859[illegible][5][illegible]·[illegible]Herbert Spencer[illegible]“[illegible]”[illegible]life-form[illegible]“[illegible]”[illegible]

[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]

[illegible]habitat[illegible]niche[illegible]niche[illegible]“[illegible]”[illegible]niche[illegible]——[illegible]“[illegible]”[illegible]

[illegible]

[illegible]

[illegible]17[illegible]18[illegible]——[illegible]6000[illegible]18[illegible]taxonomy[illegible]·[illegible]Carl Linnaeus[illegible]17[illegible]18[illegible]

[illegible]

[illegible]English carrier[illegible]short faced tumbler[illegible]

[illegible] runt [illegible] …… [illegible] pouter [illegible][6]

[illegible] —— [illegible]

[illegible] 18 [illegible]

19 [illegible] · [illegible] Erasmus Darwin [illegible] 1809 [illegible] —— [illegible] · [illegible] JeanBaptiste Lamarck [illegible] —— [illegible] —— [illegible]

[illegible] 20 [illegible]

[illegible]

1831[illegible]“[illegible]”[illegible]Beagle[illegible]

[illegible]·[illegible]“[illegible]”[illegible]1838[illegible]·[illegible]Thomas Malthus[illegible]

> [illegible]·[illegible]Sir John Selbright[illegible]“[illegible]”[illegible]Saxony[illegible]merino sheep[illegible][7]

[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]fitness[illegible]

[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”（artificial selection）[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]·[illegible]——[illegible]

[illegible][8][illegible]

[illegible]

[illegible]……
[illegible]——

[illegible]……[illegible]“[illegible]”[illegible][9]

[illegible]

[illegible]

[illegible]“[illegible]”[illegible]1.5[illegible]1862[illegible]

[illegible]

[illegible]

[illegible]6[illegible]·[illegible]Yves Coppens[illegible]“[illegible]”[10][illegible]1[illegible]1[illegible]19[illegible]“[illegible]”[illegible]——[illegible]——[illegible]

[illegible]20[illegible]

[illegible]20[illegible]

[illegible]1[illegible]40[illegible]40[illegible]20[illegible]

[illegible]·[illegible]Gregor Mendel[illegible]20[illegible]——[illegible]DNA[illegible]50[illegible][11][illegible]·[illegible]Francis Crick[illegible]·[illegible]James Watson[illegible]1953[illegible]

[illegible]

[illegible]97%[illegible]“[illegible]”[illegible]

[illegible]

[illegible]“[illegible]”[illegible]punctuated evolution[illegible]·[illegible]Niles Eldridge[illegible]·[illegible]·[illegible]Stephen Jay Gould[illegible]1972[illegible]

[illegible]

[illegible][12][illegible]17[illegible]“[illegible]”[illegible]

[illegible]·[illegible]Louis Pasteur[illegible]——[illegible]19[illegible]1862[illegible]spore[illegible]

[illegible]Cambrian Era[illegible]6[illegible]19[illegible]

[illegible]19[illegible]

[illegible]20[illegible]·[illegible]（Alexander Oparin）[illegible]·[illegible]·[illegible]（John Burdon Haldane）[illegible]20[illegible]20[illegible]“[illegible]”[illegible]

[illegible]DNA[illegible]

[illegible]99%[illegible][13][illegible][14][illegible]

[illegible]1952[illegible]·[illegible]（Harold Urey）[illegible]·[illegible]（Stanley Miller）[illegible]

[illegible]7[illegible]20[illegible]20—40[illegible]20[illegible]“[illegible]——[illegible]”[illegible]

[illegible]“[illegible]——[illegible]”[illegible]

[illegible]phospholipid[illegible]——[illegible]——[illegible]1996[illegible]1.3[illegible][15][illegible]

[illegible]100[illegible]1[illegible]——100[illegible]10^{12}——10^{14}[illegible]

[illegible]

[illegible]·[illegible]Fred Hoyle[illegible]·[illegible]Chandra Wickramasinghe[illegible]Panspermia[illegible]

[illegible]——[illegible]——[illegible]Biogenesis[illegible]1871[illegible]“[illegible]”[illegible][16][illegible]

[illegible]A. G.[illegible]——[illegible]A. G. Cairns-Smith[illegible][17][illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible][18][illegible]

[illegible]40[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]——[illegible]38[illegible]——[illegible]archaebacteria[illegible][19][illegible]prokaryote[illegible]“[illegible]”[illegible]20[illegible]90[illegible]1000[illegible]2001[illegible]“[illegible]”[illegible]olivine[illegible][20][illegible]

[illegible]“[illegible]——[illegible]”[illegible]

[illegible][21]

[illegible]——[illegible][22]

[illegible]“[illegible]”[illegible]·[illegible]10[illegible][23][illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible][24][illegible]autocatalysis[illegible]runaway reaction[illegible]

[illegible]2[illegible]

[illegible]A[illegible]T[illegible]cytosine[illegible]C[illegible]guanine[illegible]G[illegible]A[illegible]T[illegible]C[illegible]G[illegible]

[illegible]“[illegible]”[illegible]——[illegible]

20[illegible]60[illegible]RNA[illegible]“[illegible]

[illegible]”[illegible]

[illegible]·[illegible]Manfred Eigen[illegible]·[illegible]Leslie Orgel[illegible][25][illegible]“[illegible]”[illegible]·[illegible]“[illegible]”[illegible][26]

[illegible]·[illegible][27][illegible]ATP[illegible]“[illegible]”[illegible]

[illegible]5[illegible]

[illegible]10[illegible]20[illegible]

[illegible]

[illegible]20[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]10[illegible]

[illegible]

[illegible]1859[illegible]1968[illegible]·[illegible]Steve Jones[illegible]2000[illegible]·[illegible]1998[illegible]·[illegible]·[illegible]·[illegible]Daniel Dennett[illegible]1995[illegible]·[illegible]Ernst Mayr[illegible]1991[illegible]·[illegible]·[illegible]John Maynard Smith[illegible]1975[illegible]3[illegible]·[illegible]1999[illegible]·[illegible]1944[illegible]1992[illegible]·[illegible]1999[illegible]2[illegible]A. G.[illegible]——[illegible]1985[illegible]·[illegible]Robert Shapiro[illegible]1986[illegible]·[illegible]·[illegible]“[illegible]”[illegible]1987[illegible]·[illegible]2001[illegible]1987[illegible]

[illegible]1988[illegible]·[illegible]Stuart Kauffman[illegible]1995[illegible]·[illegible]Roger Lewin[illegible]1993[illegible]1999[illegible]4[illegible]

---

[1] [illegible]·[illegible]1992[illegible]1944[illegible]77[illegible]

[2] [illegible]·[illegible]Φm[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]——[illegible]——[illegible]power-to-mass[illegible]”[illegible]2001[illegible]134[illegible]

[3] [illegible]73[illegible]

[4] [illegible]·[illegible]1999[illegible]12[illegible]

[5] [illegible]·[illegible]·[illegible]Alfred Russel Wallace[illegible]1858[illegible]Linnaean Society[illegible]

[6] [illegible]·[illegible]1968[illegible]82[illegible]J. W. Burrow[illegible]

[7] [illegible]90[illegible]1995[illegible]42[illegible]——[illegible]

[8] [illegible]·[illegible]“[illegible]”[illegible]·[illegible]1995[illegible]

[9] [illegible]441—442[illegible]115[illegible]·[illegible]Tim Megarry[illegible]1995[illegible]1995[illegible]534[illegible]535[illegible]76[illegible]——[illegible]

[10] [illegible]·[illegible]Hubert Reeves[illegible]·[illegible]·[illegible]Joël de Rosnay[illegible]·[illegible]·[illegible]Dominique Simonnet[illegible]1998[illegible]138[illegible]

[11] [illegible]·[illegible]1998[illegible]135[illegible]·[illegible]1995[illegible]90[illegible]

[12] [illegible]·[illegible]David Briscoe[illegible]1989[illegible]·[illegible]·[illegible]1995[illegible]64—69[illegible]

[13] [illegible]·[illegible]·[illegible]40[illegible]1987[illegible]48[illegible]

[14] [illegible]NH2[illegible]COOH[illegible]phosphate[illegible]nitrogen[illegible]

[illegible]nucleic acids[illegible]cell nuclei[illegible]

[15] [illegible]·[illegible]Malcolm Walter[illegible]1999[illegible]

[16] [illegible]·[illegible]1999[illegible]54[illegible]

[17] A. G. [illegible]——[illegible]1985[illegible]

[18] [illegible]·[illegible]92[illegible]

[19] [illegible]7[illegible]

[20] [illegible]·L.[illegible]·[illegible]Karen L. Von Damm[illegible]2001[illegible]7[illegible]12[illegible]127—128[illegible]

[21] [illegible]·[illegible]Birger Rasmussen[illegible]32.35[illegible]2000[illegible]6[illegible]8[illegible]676—679[illegible]“[illegible]”[illegible]extremophile[illegible]32[illegible]Pilbara[illegible]“[illegible]”[illegible]5[illegible]

[22] [illegible]·[illegible]1999[illegible]2[illegible]

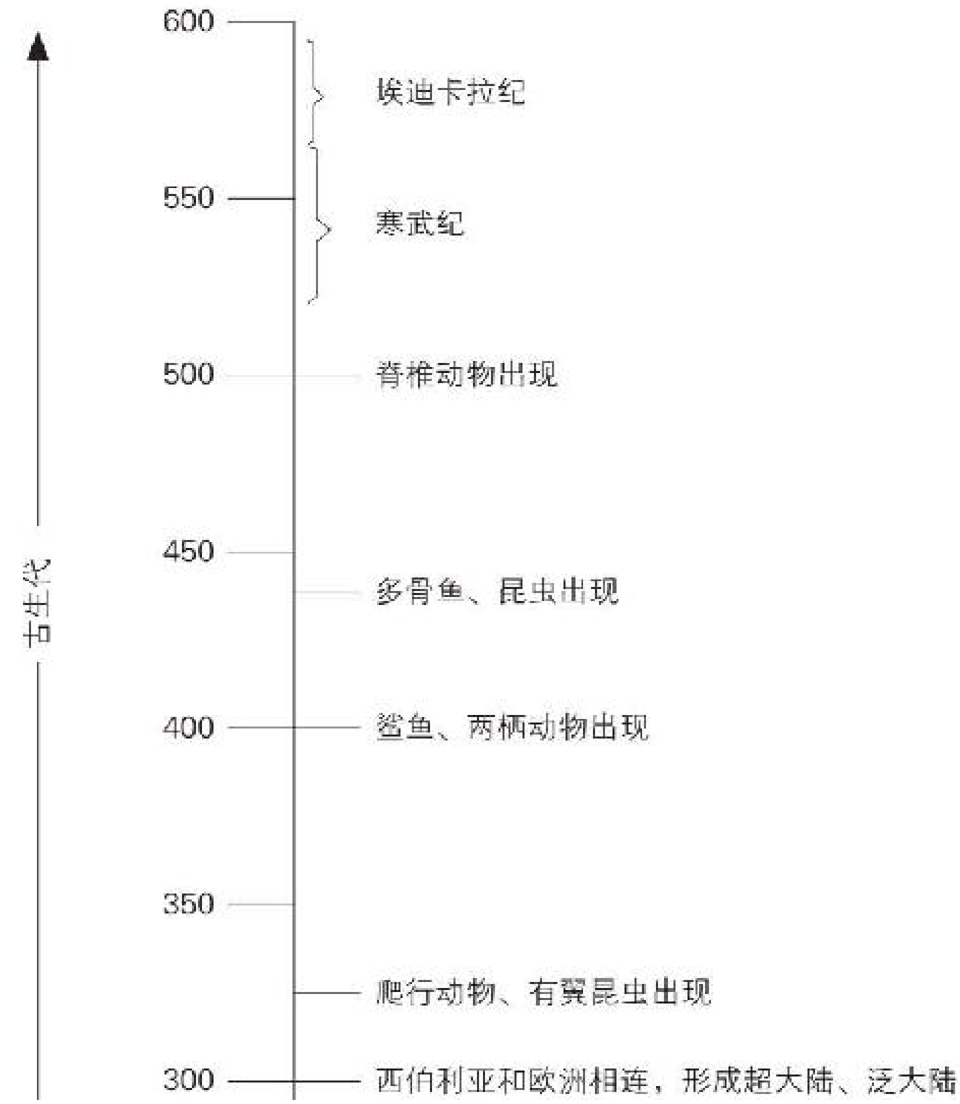
[23] [illegible]·[illegible]2[illegible]·[illegible]1995[illegible]151[illegible]·[illegible]747[illegible]

[24] [illegible]·[illegible]1989[illegible]

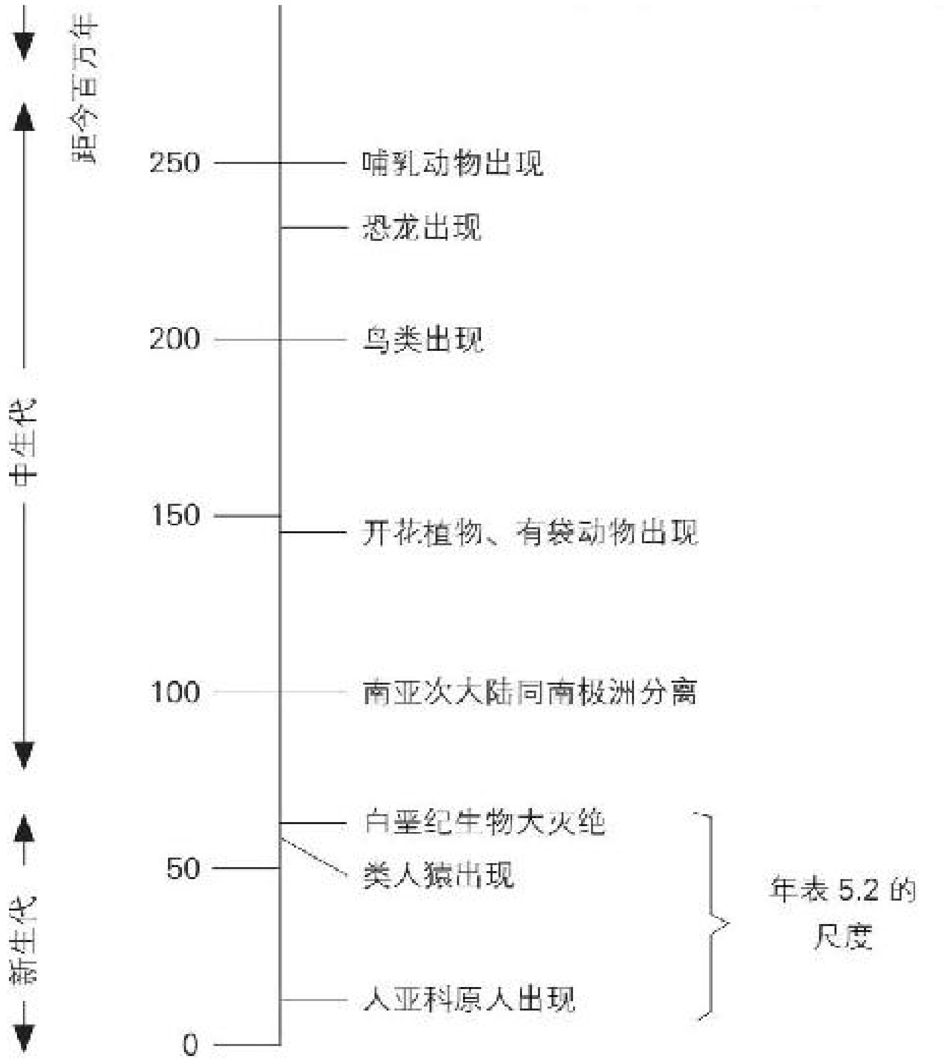
[25] [illegible]·[illegible]·[illegible]·[illegible]Eörs Szathmáry[illegible]1999[illegible]3[illegible]4[illegible]“[illegible]”[illegible]

[26] [illegible]40[illegible]

[27] [illegible]3[illegible]



古生代
600
550
500
450
400
350
300
埃迪卡拉纪
寒武纪
脊椎动物出现
多骨鱼、昆虫出现
鲨鱼、两栖动物出现
爬行动物、有翼昆虫出现
西伯利亚和欧洲相连，形成超大陆、泛大陆



距今百万年
250
200
150
100
50
0
中生代
新生代
哺乳动物出现
恐龙出现
鸟类出现
开花植物、有袋动物出现
南亚次大陆同南极洲分离
白垩纪生物大灭绝
类人猿出现
人亚科原人出现
年表 5.2 的
尺度

[illegible]5.1 [illegible]6[illegible]

[illegible]5[illegible]
[illegible]

[illegible]

[illegible]

[illegible]40[illegible]·[illegible]·[illegible]Dorion Sagan[illegible]“[illegible]”[illegible][1][illegible]·[illegible]·[illegible][2][illegible]40[illegible]·[illegible]·[illegible]John Maynard Smith[illegible]·[illegible]“[illegible]……[illegible]”[3]“[illegible]”[illegible]——[illegible]

[illegible][4][illegible]

[illegible]——[illegible]——[illegible]——[illegible]

[illegible]6[illegible]8[illegible]3[illegible]2/3[illegible]1.9[illegible]1.3[illegible]4000[illegible]

[illegible]

[illegible]7[illegible]1/5[illegible]——[illegible]——[illegible]“[illegible]”[illegible]35[illegible]

[illegible]40[illegible]40[illegible]25[illegible]——20[illegible][5]

[illegible]38[illegible]C^{12}[illegible]35[illegible][6][illegible]·[illegible]“[illegible]”[illegible][7]

[illegible]“[illegible]”[illegible]——[illegible]

[illegible]“[illegible]”[illegible]35[illegible]

[illegible][8][illegible]——[illegible]3[illegible]

[illegible]

[illegible]

[illegible]30[illegible]

[illegible]

[illegible][9]

[illegible]——[illegible]——[illegible]“[illegible]”[illegible][10][illegible]

[illegible]“[illegible]”[11][illegible]

[illegible]

[illegible]

[illegible]——[illegible]——[illegible]

[illegible]25[illegible]20[illegible]3%[illegible]10[illegible]21%[illegible][12][illegible]

[illegible]“[illegible]”[illegible][13][illegible]·[illegible]James Lovelock[illegible]“[illegible]20[illegible]”[14]

[illegible]20[illegible]“[illegible]”[illegible]“[illegible]”[illegible][15][illegible]“[illegible]”[16]

[illegible]20[illegible]“[illegible]”[illegible]30[illegible]O3[illegible]17[illegible][17][illegible][18][illegible]0.001[illegible]——0.01[illegible]0.01[illegible]——0.1[illegible]1000[illegible]·[illegible]Chet Raymo[illegible]“[illegible]”[19][illegible]5.1[illegible]

[illegible]——[illegible]——[illegible]——[illegible]

· —— ——

parasitism

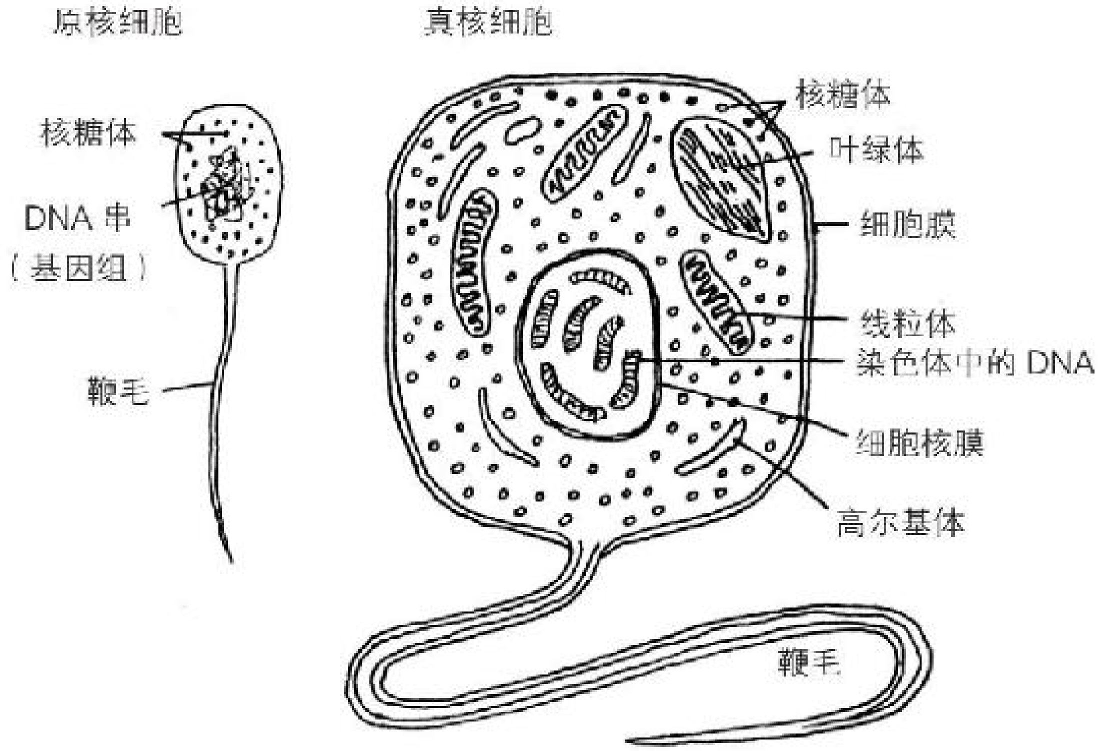
commensalism

mutualism

“ ”

“ ”

“ ”



□5.1 □□□□□□□□□□□□□□

□□·□□1998□□□□164□□□□□□□□□□□□□□

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[illegible]”[21][illegible]12[illegible]

[illegible]10[illegible][22]

[illegible]

[illegible]

[illegible]“[illegible]”——[illegible]6[illegible]

[illegible]20[illegible][23][illegible]10[illegible]

[illegible]

[illegible]

> [illegible]1000[illegible]“[illegible]”[illegible]——[illegible][24]

[illegible]

[illegible]50%[illegible][25][illegible]

[illegible]“[illegible]”[illegible]

[26] —— ——

5.9 5.7

1000 —— 250 3 60 30 60 [27] “ ” “ ”

6

—— “ ” [28]

Linnaeus ——

[illegible]19[illegible]·[illegible]（Ernst Haeckel[illegible]——[illegible]20[illegible]30[illegible]20[illegible]20[illegible]90[illegible]·[illegible]（Carl Woese[illegible]

[illegible]5.1 [illegible]

总界	界	成员
原核生物总界（没有核子的单细胞生物体）	原核生物界	细菌，蓝藻，原始细菌（有时被列入一个独立的界）
真核生物总界（有核子和细胞器官）	原生生物界（多数为单细胞生物）	原生植物，原生动物粘（真）菌
	植物界（多细胞生物，包含叶绿素，能进行光合作用，通常不能移动）	藻类，苔藓类植物（苔、叶苔和金鱼藻），蕨类植物，裸蕨植物，石松类，柏类，松类，银杏类，苏铁类，开花植物
	真菌界（多细胞生物，不含叶绿素，通过分解有机的残留物获得能量，通常不能移动）	酵母，毒蕈和蘑菇
	动物界（多细胞生物，不含叶绿素，从其他生物体处获得能量，通常可移动）	原生动物，海绵体，珊瑚虫，扁形虫，绦虫，节肢动物，软体动物，腕足动物，环节动物，苔藓虫，棘皮类动物，半索海生动物和脊索动物，包括脊椎动物

[illegible]5.1[illegible]

[illegible][29]

[illegible]5.9[illegible]5.7[illegible]Burgess shale[illegible]5.2[illegible]·[illegible]·[illegible][30][illegible]

[illegible]5.1[illegible]——4.4[illegible]“[illegible]”[illegible][31][illegible]4.1[illegible]——3.6[illegible]“[illegible]”[illegible]

[illegible]——[illegible][32][illegible]4.4[illegible]——4.1[illegible]5.1[illegible]4.4[illegible]

[illegible]

[illegible]·[illegible]Nicholas Humphrey[illegible]“[illegible]”[illegible]“[illegible]”[33][illegible]·[illegible]Terrence Deacon[illegible]sentience[illegible]consciousness[illegible]“[illegible]”[34][illegible]——[illegible][35][illegible]“[illegible]”[illegible]

[illegible]——[illegible]——[illegible]3.2[illegible]3.6[illegible]——2.9[illegible]“[illegible]”[illegible]“[illegible]”[illegible]2.5[illegible][36][illegible]2.5[illegible]——2.1[illegible]6500[illegible][37]

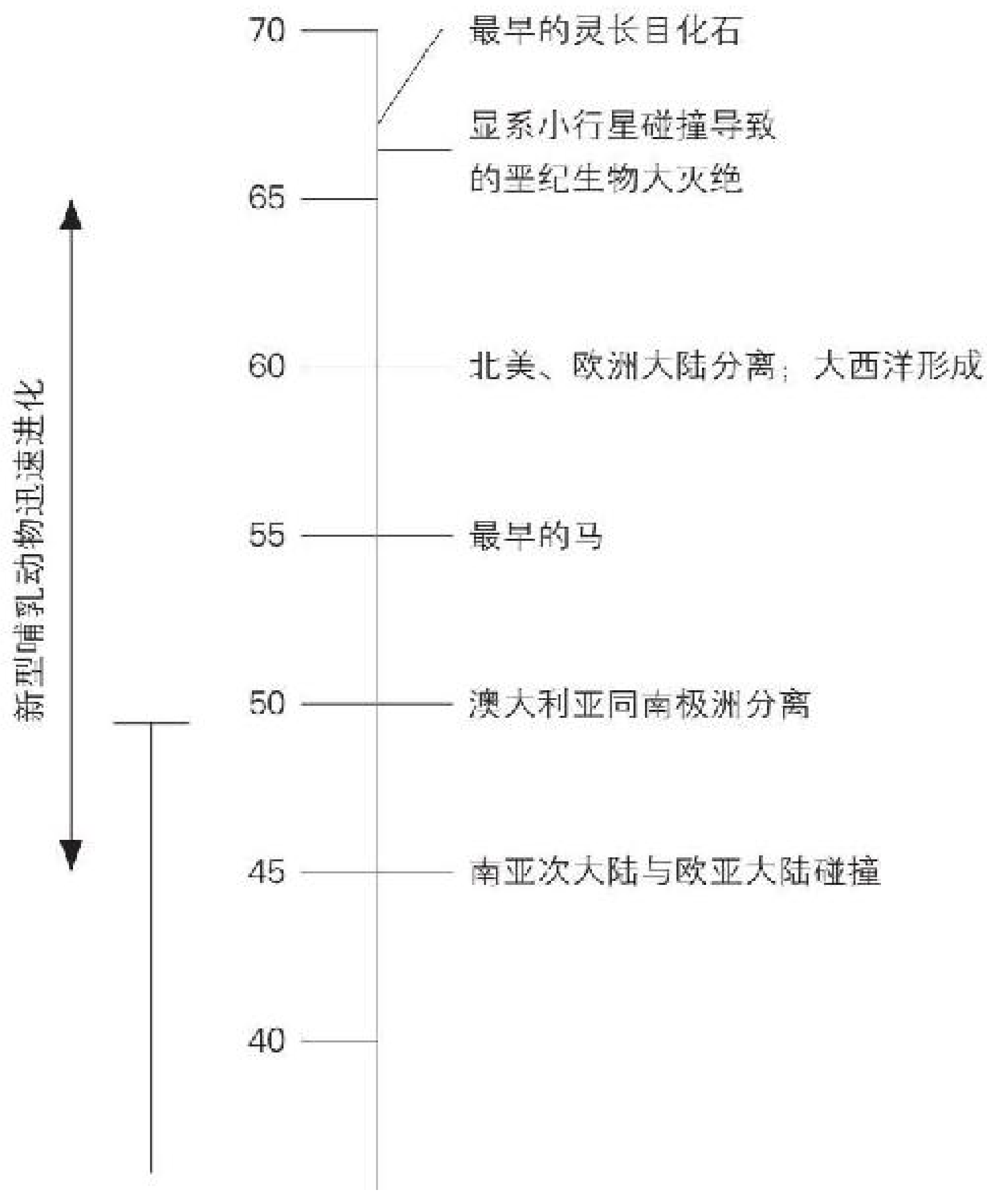
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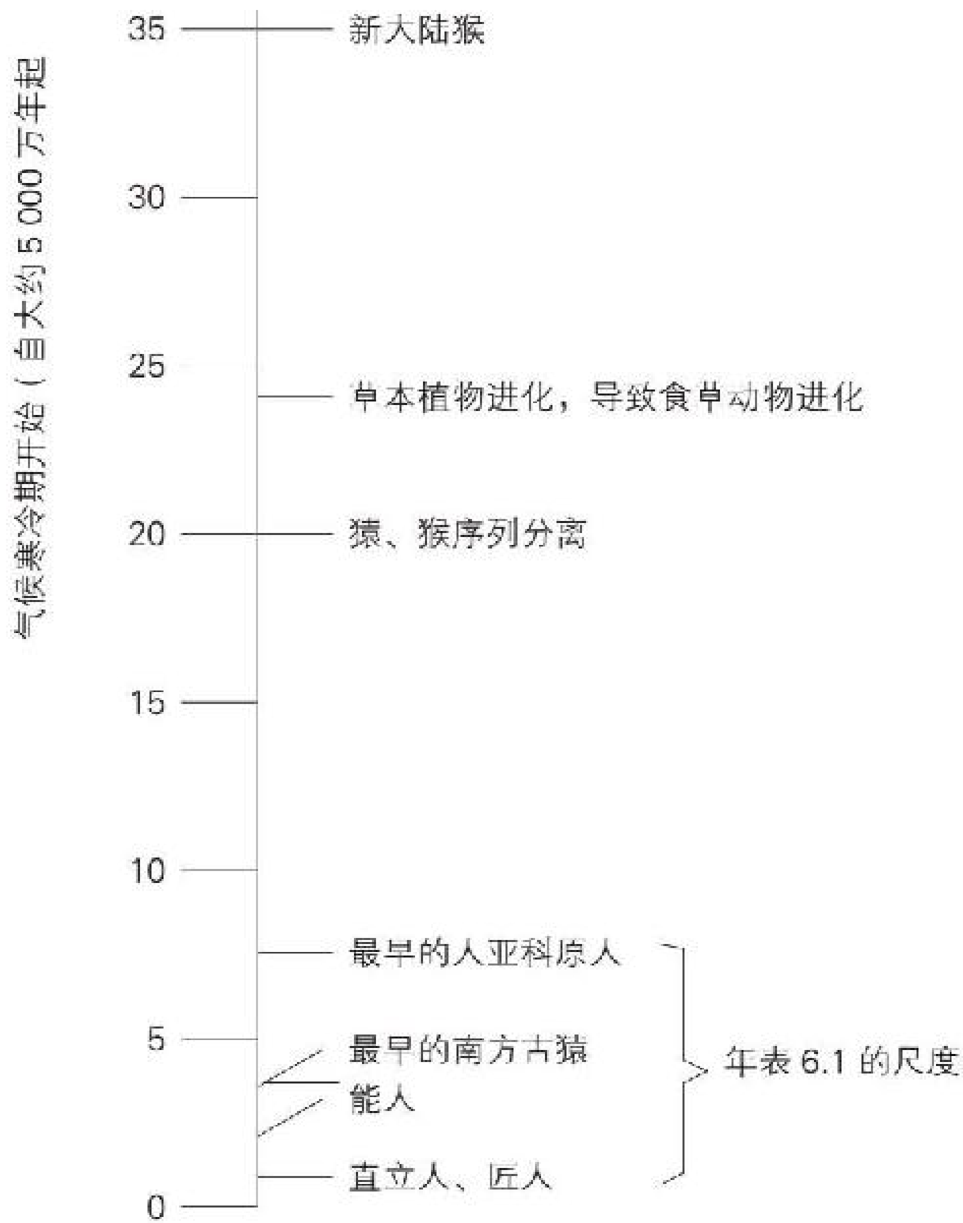
[illegible]

[illegible] 5.2 [illegible]

[illegible] —— [illegible]

[illegible] [39] [illegible]


70
最早的灵长目化石
显系小行星碰撞导致
的垩纪生物大灭绝
65
60
北美、欧洲大陆分离；大西洋形成
55
最早的马
50
澳大利亚同南极洲分离
45
南亚次大陆与欧亚大陆碰撞
40
新型哺乳动物迅速进化



[illegible]5.2 [illegible]7000[illegible]

[illegible]200[illegible]

[illegible]Hominoidea, hominoids[illegible]

[illegible]2500[illegible]

[illegible]Alvares[illegible]17[illegible]

[illegible]“[illegible]dari[illegible]

[illegible]Amienu[illegible]”[40]

[illegible]Hominoidea[illegible]Hominidae[illegible]Pongidae[illegible]Hylobatidae[illegible]Gorillinae[illegible]Homininae[illegible]500[illegible]700[illegible]6[illegible]

[illegible]“[illegible]”

[illegible]

[illegible]·[illegible]James Lovelock[illegible]“[illegible]”——[illegible]

[illegible]20[illegible]70[illegible][41]

[illegible]46[illegible]40%[illegible]15℃[illegible]DMS[illegible][42]

[illegible]“[illegible]”[illegible]·[illegible]“[illegible]”[illegible][43]

[illegible]

[illegible]……[illegible][44]

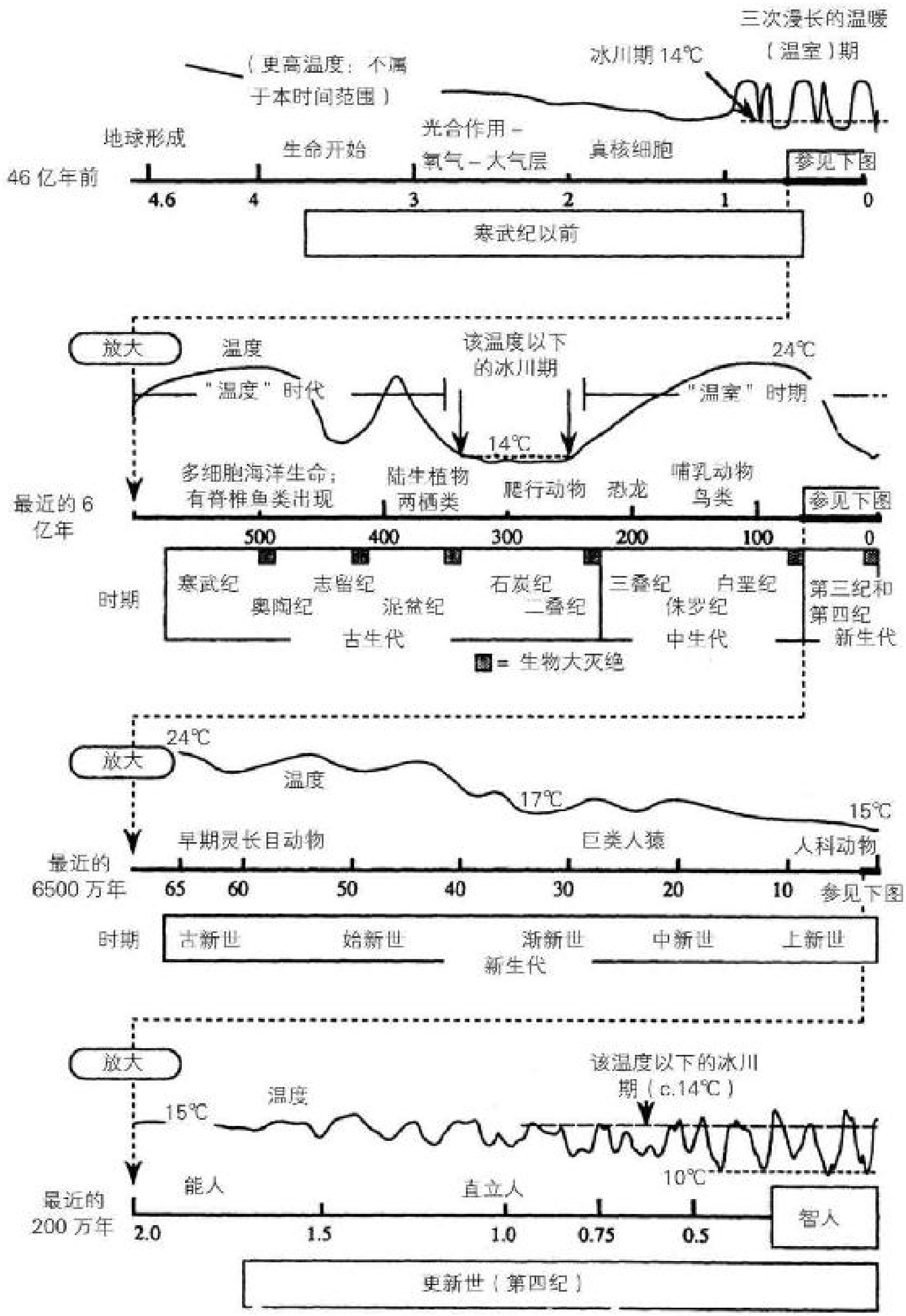
[illegible]——[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]5[illegible]——[illegible]75%[illegible]2.5[illegible]95%[illegible][45][illegible]

[illegible]2300[illegible]520[illegible]520[illegible]160[illegible]600[illegible]6%[illegible]

[illegible]350[illegible]
250[illegible]90[illegible]
[illegible]“[illegible]”[illegible]5.2[illegible][46]

[illegible]500[illegible]
[illegible]280[illegible]4[illegible]100[illegible]
[illegible]7[illegible]100[illegible]1[illegible][47][illegible]
[illegible]1[illegible]
[illegible]10[illegible]1[illegible]1[illegible]
[illegible]



三次漫长的温暖（温室）期
冰川期 14℃
（更高温度：不属于本时间范围）
地球形成
生命开始
光合作用－氧气－大气层
真核细胞
参见下图
46 亿年前
4.6
4
3
2
1
0
寒武纪以前
放大
温度
该温度以下的冰川期
24℃
"温度"时代
"温室"时期
14℃
多细胞海洋生命；有脊椎鱼类出现
陆生植物两栖类
爬行动物
恐龙
哺乳动物鸟类
参见下图
最近的 6 亿年
500
400
300
200
100
0
时期
寒武纪
奥陶纪
志留纪
泥盆纪
石炭纪
二叠纪
三叠纪
侏罗纪
白垩纪
第三纪和第四纪
古生代
中生代
新生代
= 生物大灭绝
放大
24℃
温度
17℃
15℃
早期灵长目动物
巨类人猿
人科动物
最近的 6500 万年
65
60
50
40
30
20
10
参见下图
时期
古新世
始新世
渐新世
中新世
上新世
新生代
放大
该温度以下的冰川期（c.14℃）
温度
15℃
10℃
能人
直立人
智人
最近的 200 万年
2.0
1.5
1.0
0.75
0.5
更新世（第四纪）

[illegible]5.2 [illegible]

[illegible]100[illegible]A. J. McMichael[illegible]1993[illegible]27[illegible]

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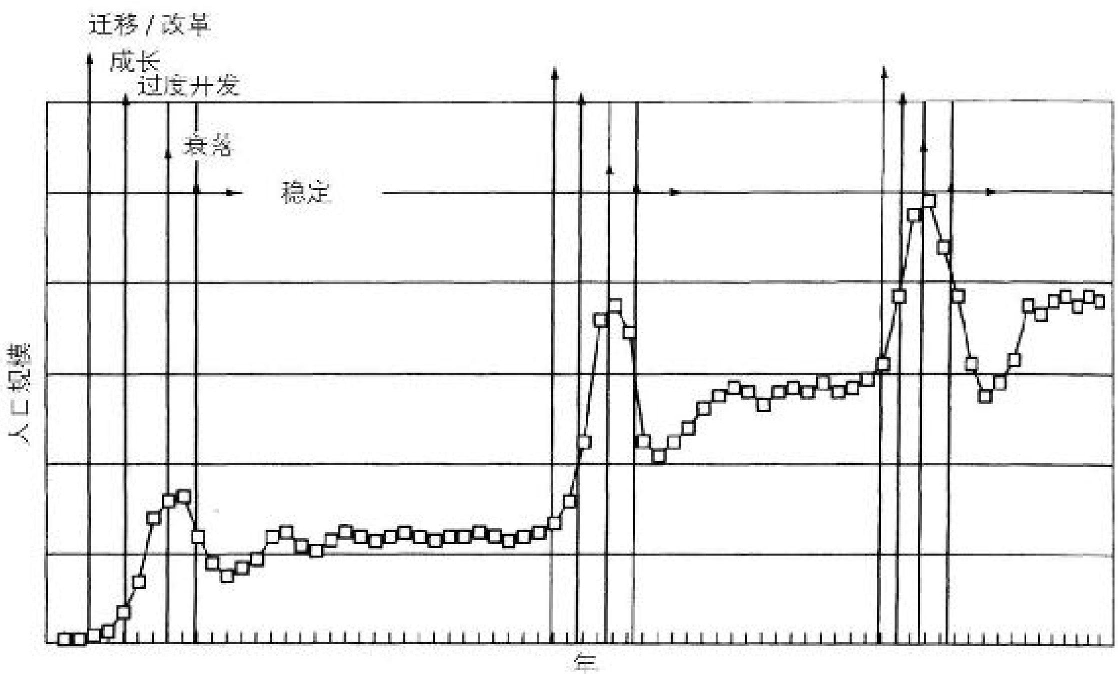
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[illegible]5.3 [illegible]

[illegible]

[illegible]

[illegible]40[illegible]

[illegible]30[illegible]6[illegible]

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[6] [illegible]·[illegible]1999[illegible]3[illegible]20[illegible]

[7] [illegible]·[illegible]1999[illegible]10[illegible]

[8] [illegible]·[illegible]John Snyder[illegible]C.[illegible]·[illegible]C. Leland Rodgers[illegible]1995[illegible]3[illegible]5[illegible]6[illegible]

[9] [illegible]·[illegible]·[illegible]97[illegible]

[10] [illegible]·[illegible]·[illegible]88[illegible]

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[37] [illegible]“[illegible]”[illegible]·[illegible]·[illegible]Jeannin Davis Kimball[illegible]·[illegible]Mona Behan[illegible]2002[illegible]6[illegible]

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[41] □□□·□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1988□□□□19□□

[42] □□□□□□□□□□·□□□1831—1914□□□□“□□□”□□“□□□”□□□□□□□□□□□□□□□□□□□□□□□□1863—1945□□□□□□□□□“□□□□”□□□□□□□□□□□□□□□□□□□□48□□□□□□□

[43] □□·□□□□□□□□□□□□□□□□□□1998□5□30□□□28—33□□□□□□□□□□□□□□□□□□□□□

[44] □□·□□□□□□□□·□□□□□□□□□□□91□□

[45] □□□□□□□□□□□27□□□

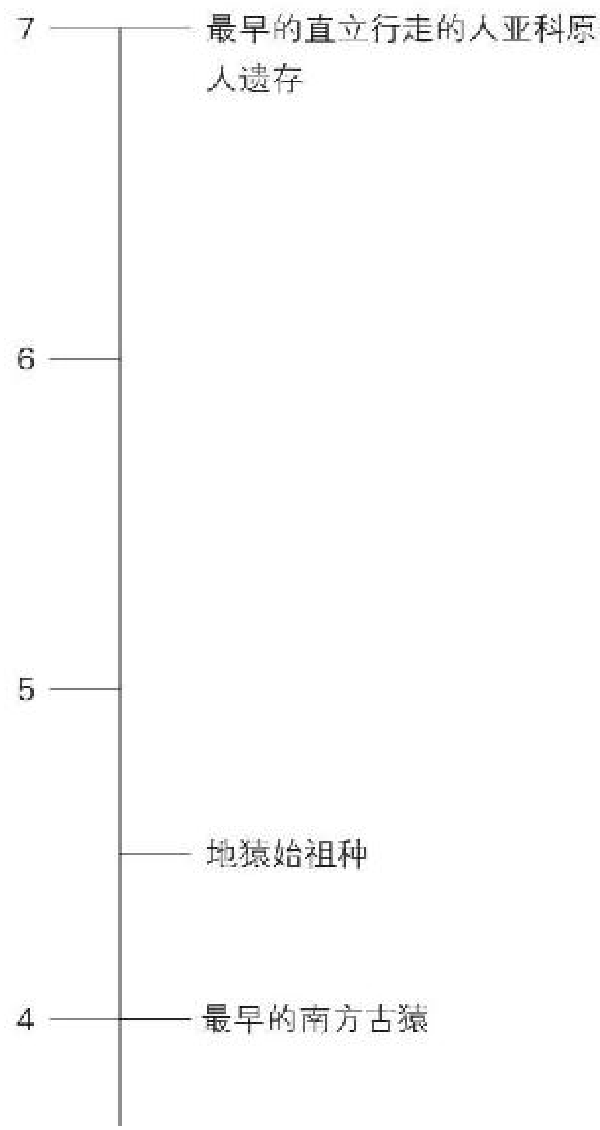
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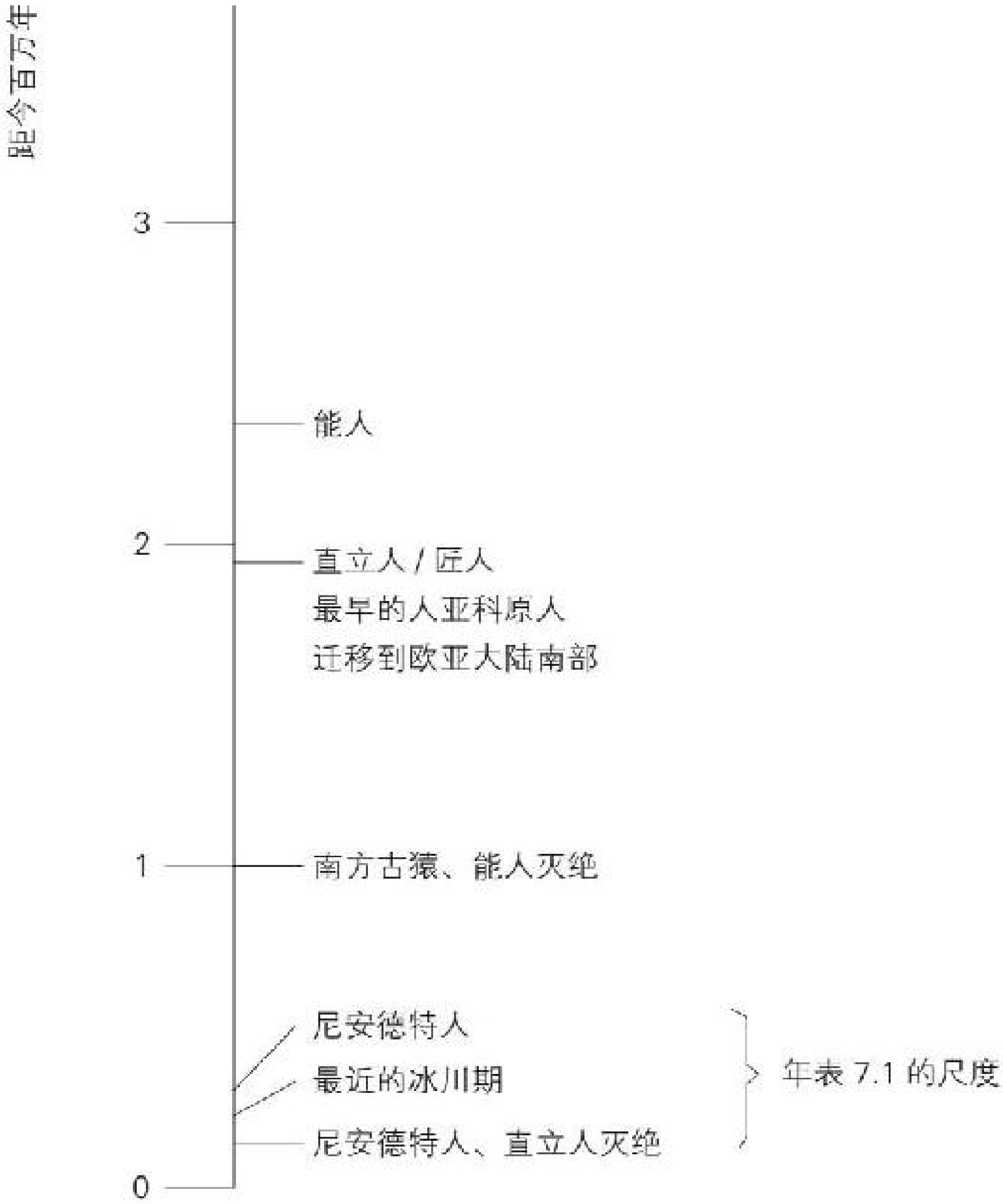
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[48] □□□□□□□□□□□Australasia□□□□□□□□·□□1995□□□□□□□□□□□□□□□□□□344□□MIGODS□□□□Migration□□□□□Innovation □□□□□Growth □□□□□□□Overexploitation □□□□□Decline □□□□□Stabilization□□□□□□□□□□□□□——□□□

[49] “□□□□Leibig□□□□□□□□……□□□□□□□□□□□□□□□□□□□□□□□□□”□□□·W.□□□□Allen W. Johnson□□□□□·□□□□□□□□□□□□□□□□□□□□□□□□□□□□□2□□□□□□□□□□□□□□□2000□□□□14—15□□□

3


7
最早的直立行走的人亚科原人遗存
6
5
地猿始祖种
4
最早的南方古猿



距今百万年
3
能人
2
直立人／匠人
最早的人亚科原人
迁移到欧亚大陆南部
1
南方古猿、能人灭绝
尼安德特人
最近的冰川期
尼安德特人、直立人灭绝
0
年表 7.1 的尺度

[illegible]6.1 [illegible]700[illegible]

[illegible]6[illegible]
[illegible]

[illegible]——[illegible]——[illegible]

[illegible]

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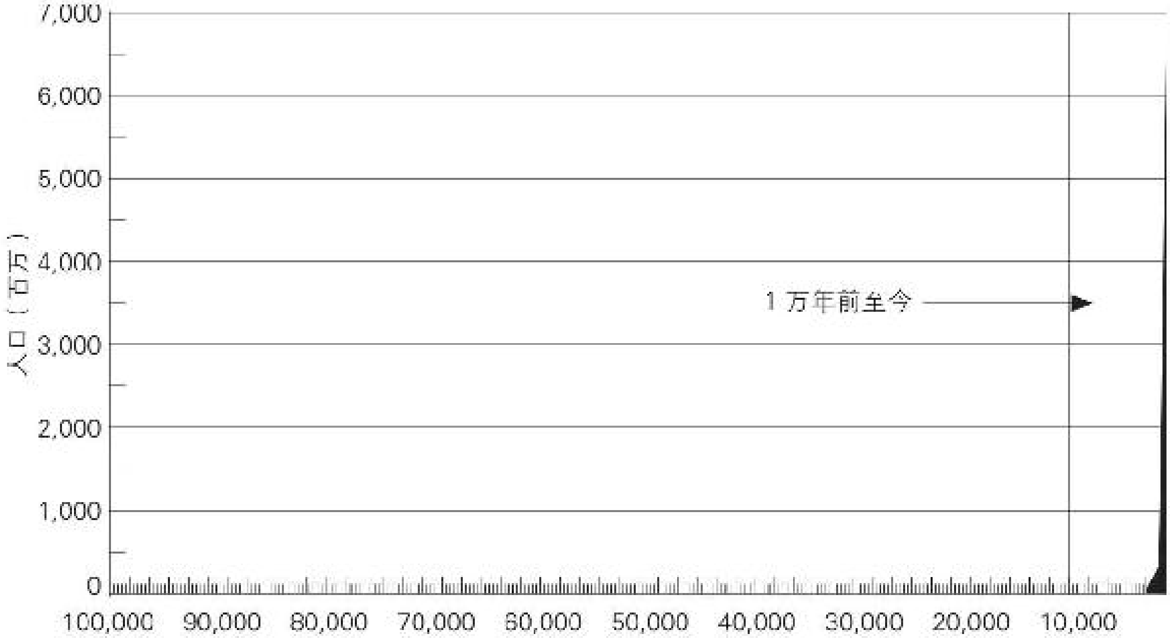
[illegible]6.1[illegible]“[illegible]”[illegible]1[illegible]6000[illegible]1[illegible]60[illegible]6.1[illegible]5[illegible]NPP[illegible]“[illegible]”[illegible]25%[illegible]40%[illegible]·[illegible]“[illegible]1/4[illegible]”[3]

[illegible]6.1 [illegible]=1000[illegible]/[illegible]

	食物（含喂养动物）	家庭与商业	工业与农业	交通	人均总计	全部人口（百万计）	总计
技术社会（当代）	10	66	91	63	230	6000	1380000
工业社会（1850年前）	7	32	24	14	77	1600	123200
高级农业社会（距今1000年）	6	12	7	1	26	250	6500
早期农耕社会（距今5000年）	4	4	4		12	50	600
狩猎者（距今1万年）	3	2			5	6	30
原始人	2				2	不详	不详

[illegible]I. G.[illegible]I. G. Simmons[illegible]2[illegible]1996[illegible]27[illegible]

[illegible]6.2[illegible]6.3[illegible]6.1[illegible]10[illegible]1[illegible]3[illegible]1[illegible]



[illegible]6.1 [illegible]10[illegible]6.2[illegible]

[illegible]6.2 [illegible]10[illegible]

距今（年）	世界人口估计数	与前一日期相比每百年增长率（%）	所示翻番时间（年）	数据来源
10 万	1 万	—	—	斯特林格，150
3 万	50 万	0.56	12403	利维-巴奇，31
1 万	600 万	1.25	5580	利维-巴奇，31
5000	5000 万	4.33	1635	比拉本
3000	12000 万	4.47	1583	比拉本
2000	25000 万	7.62	944	利维-巴奇，31
1000	25000 万	0.00	∞	利维-巴奇，31
800	40000 万	26.49	295	利维-巴奇，31

距今（年）	世界人口估计数	与前一日期相比每百年增长率（%）	所示翻番时间（年）	数据来源
600	37500 万	−3.18	不详	利维−巴奇，31
400	57800 万	24.5	320	利维−巴奇，31
300	68000 万	17.65	427	利维−巴奇，31
200	95400 万	40.29	205	利维−巴奇，31
100	163400 万	71.28	129	利维−巴奇，31
50	253000 万	139.74	79	利维−巴奇，31
0	600000 万	462.42	40	利维−巴奇，31

□□□□□□□□□J. R. Biraben□□□□□□□□□□□□□□□□□□□□34□□1997□□□□13—25□□□□□·□□——□□□Massimo Livi-Bacci□□□□□□□□□□□□□□□·□□□□Carl Ipsen□□□□□□□□□□□□□□□□1996□□□□□□·□□□□□Chris Stringer□□□□·□□□Robin Mckie□□□□□□□□□□□□□□□□□□□1996□□

□6.3 □□□□□□□□□□□□□□

时代	起始（距今年）	结束（距今年）	起始人口（百万）	结束人口（百万）	每百年增长率（%）	所示翻番时间（年）
旧石器时代	10 万	1 万	0.01	6	0.71	9752
中期	10 万	3 万	0.01	0.5	0.56	12403
晚期	3 万	1 万	0.5	6	1.25	5579
农耕时代	1 万	1000	6	250	4.23	1673
早期	1 万	5000	6	50	4.33	1635
农耕文明	5000	1000	50	250	4.11	1723
公元第一个千年除外	5000	2000	50	250	5.51	1292
现代	1000	0	250	6000	37.41	218
早期	1000	200	250	950	18.16	415
工业化	200	0	950	6000	151.31	75

[illegible]“[illegible]”[illegible]4629[illegible]1096[illegible]24%[illegible]9627[illegible]1107[illegible]11%[illegible]6900[illegible]253[illegible]4%[illegible]4522[illegible]124[illegible]3%[illegible]25000[illegible]734[illegible]3%[illegible]27[illegible]25971[illegible]10%[illegible][4][illegible]6[illegible]5—6[illegible][5][illegible]10[illegible]10[illegible]

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·（Shirley Strum）“”（Pumphouse Gang）[8]

·（John Mears）“”[9]

[10]

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[illegible]“[illegible]”[illegible]——[illegible]——[illegible]——[illegible]“[illegible]”[illegible][11][illegible]·[illegible]Terrence Deacon[illegible]“[illegible]——[illegible]”[illegible][12]

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[illegible]

[illegible]20[illegible]

[illegible]·[illegible]Don Johanson[illegible]20[illegible]70[illegible]40%[illegible]300[illegible]350[illegible]

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[illegible]Laetoli[illegible]370[illegible]350[illegible]
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[illegible]

[illegible]*Pan troglodytes*[illegible]“[illegible]”[illegible][32][illegible]20[illegible]



[illegible]**6.2** [illegible]

[illegible]320[illegible]Hadar[illegible]1.1[illegible]·[illegible]G. Burenhult[illegible]5[illegible]1[illegible]1993[illegible]1[illegible]·[illegible]

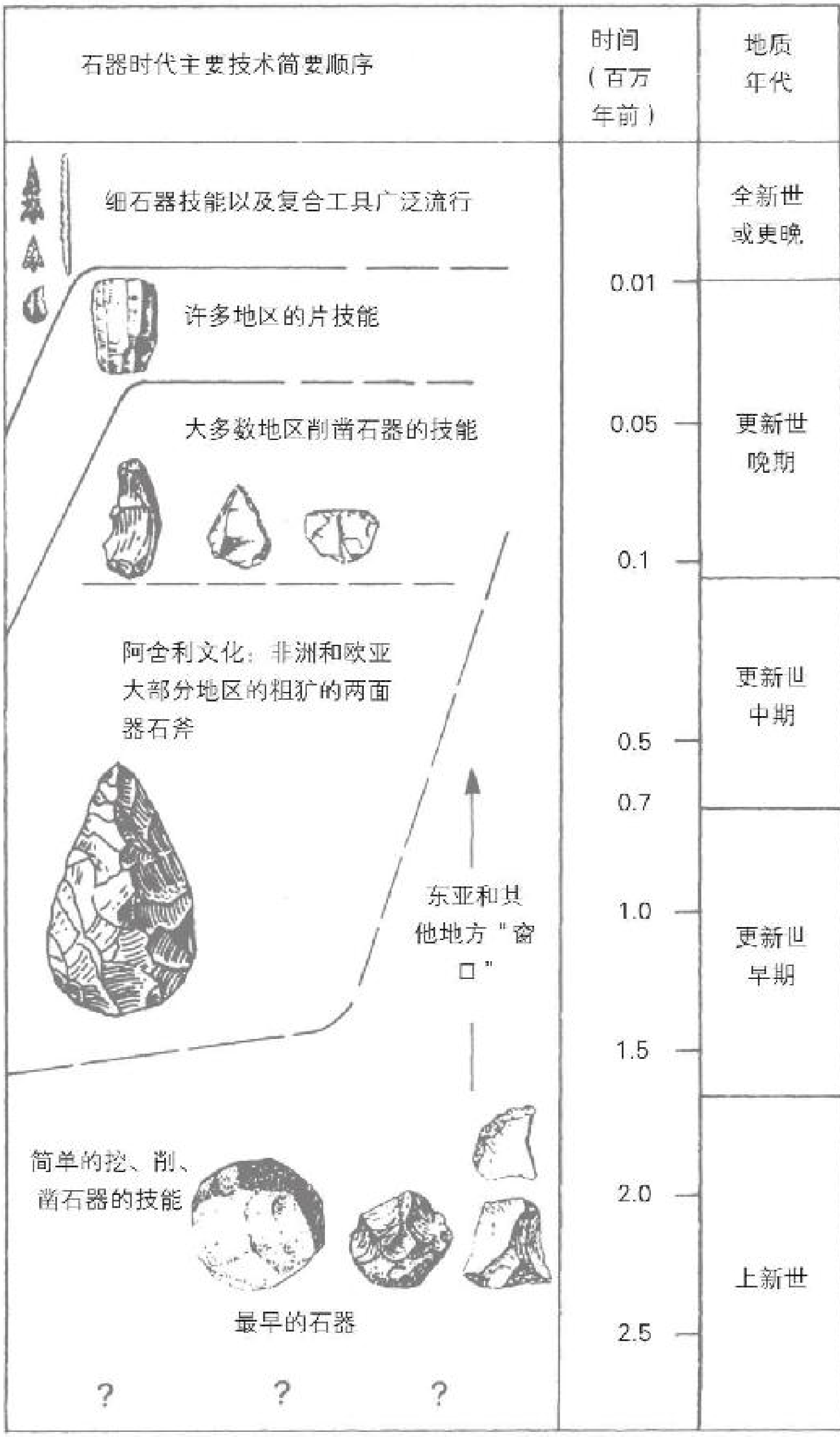
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[illegible]Serengeti Plain[illegible]50[illegible]Olduvai Gorge[illegible]1960[illegible]·[illegible]Jonathan Leakey[illegible]——[illegible]·[illegible]Louis Leakey[illegible]——[illegible]1.4[illegible]·[illegible]“[illegible]”[illegible]“[illegible]”[illegible]*Homo habilis*[illegible]

[illegible]Wenldon Owen[illegible]/[illegible]Bra Bocker[illegible]1993[illegible]·[illegible]

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石器时代主要技术简要顺序
时间（百万年前）
地质年代
细石器技能以及复合工具广泛流行
全新世或更晚
0.01
许多地区的片技能
大多数地区削凿石器的技能
0.05
更新世晚期
0.1
阿舍利文化：非洲和欧亚大部分地区的粗犷的两面器石斧
更新世中期
0.5
0.7
东亚和其他地方"窗口"
1.0
更新世早期
1.5
简单的挖、削、凿石器的技能
2.0
最早的石器
上新世
2.5
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?
?

[illegible]6.3 250[illegible]

[illegible]·[illegible]Steven Jones[illegible]·[illegible]Robert Martin[illegible]·[illegible]David Pilbeam[illegible]·[illegible]1992[illegible]357[illegible]

[illegible]Baldwinian adaptation[illegible]19[illegible]

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[illegible][36][illegible]

[illegible]

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[illegible]180[illegible]*Homo erectus*[illegible]*Homo ergaster*[illegible][37][illegible]1984[illegible]Nariokotome[illegible]180[illegible]“[illegible]”[illegible]Turkana Boy[illegible]1.5[illegible]880[illegible]1/3[illegible][38]

[illegible]100[illegible]/[illegible]850[illegible]1000[illegible]150[illegible]Acheulian[illegible]“[illegible]”[illegible]

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20[illegible]Levallois[illegible]Mousterian[illegible]

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[illegible]

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50 Neanderthal 1856 *Homo sapiens neanderthalensis* 70 55 [48]

13 25000

[illegible]

[illegible]

[illegible]25[illegible]

[illegible]

[illegible]·[illegible]1999[illegible]4[illegible]·[illegible]·[illegible]1992[illegible]·[illegible]·[illegible]1994[illegible]1981[illegible]·[illegible]1991[illegible]·[illegible]2000

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[6] A. J.[illegible]1993[illegible]33[illegible]

[7] [illegible]·[illegible]·[illegible]“[illegible]”[illegible]19[illegible]

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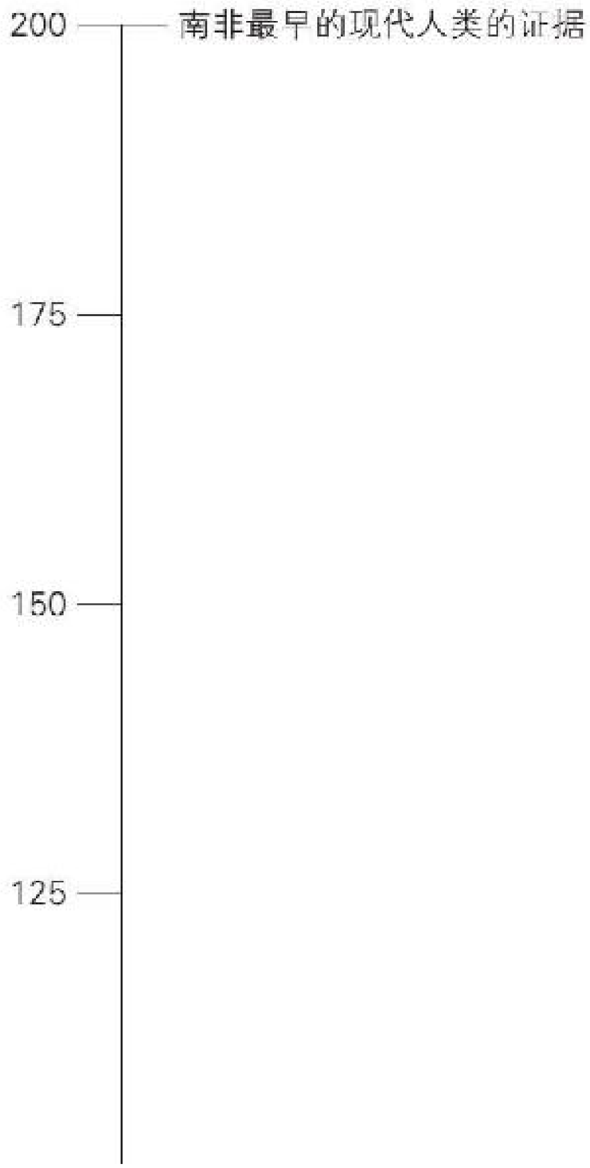
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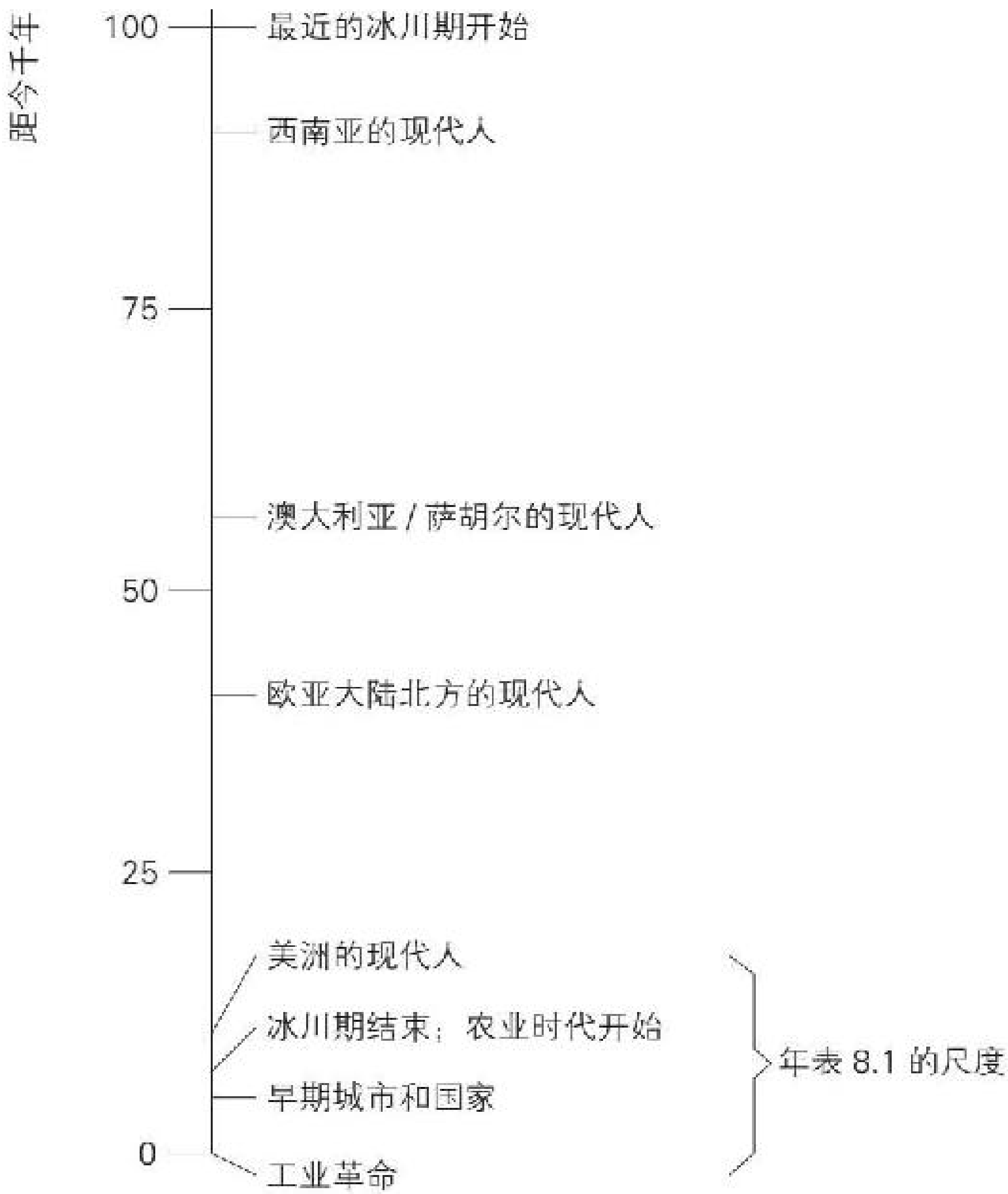
[46] [illegible]·[illegible]1997[illegible]·J.[illegible]Donna J. Haraway[illegible]1991[illegible]107[illegible]

[47] [illegible]·[illegible]1995[illegible]165—171[illegible]

[48] [illegible]96[illegible]



200
南非最早的现代人类的证据
175
150
125


距今千年
100
75
50
25
0
最近的冰川期开始
西南亚的现代人
澳大利亚 / 萨胡尔的现代人
欧亚大陆北方的现代人
美洲的现代人
冰川期结束；农业时代开始
早期城市和国家
工业革命
年表 8.1 的尺度

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[illegible]7[illegible]
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[illegible]·[illegible]Henry Plotkin[illegible]

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[illegible]·[illegible]Noam Chomsky[illegible]“[illegible]”[illegible]“[illegible]”[illegible]——[illegible][2]

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[illegible]“[illegible]”[illegible]5[illegible]

[illegible]10[illegible]·[illegible]Sally McBrearty[illegible]·[illegible]Alison Brooks[illegible]25[illegible][13]

[illegible]25[illegible]——[illegible]——[illegible]——[illegible]——[illegible]“[illegible]”[illegible]

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[illegible]“[illegible]”[illegible]531[illegible]

□□*Homo helmei*□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□——□□——□□□□□□□□□□□13□□□□□□□□□19□□□455□□□

H. helmei□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□25□——30□□□□□□□□□——□□□□□□□□□□□□□□□□□□□□——4□5□□□□□□□□□□——□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□H. helmei□□□□□□□□□□□□□□H. helmei□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□H. helmei□□□□□□□□□□□□□□□□□□□□□□□□□□□25□——30□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□529□□

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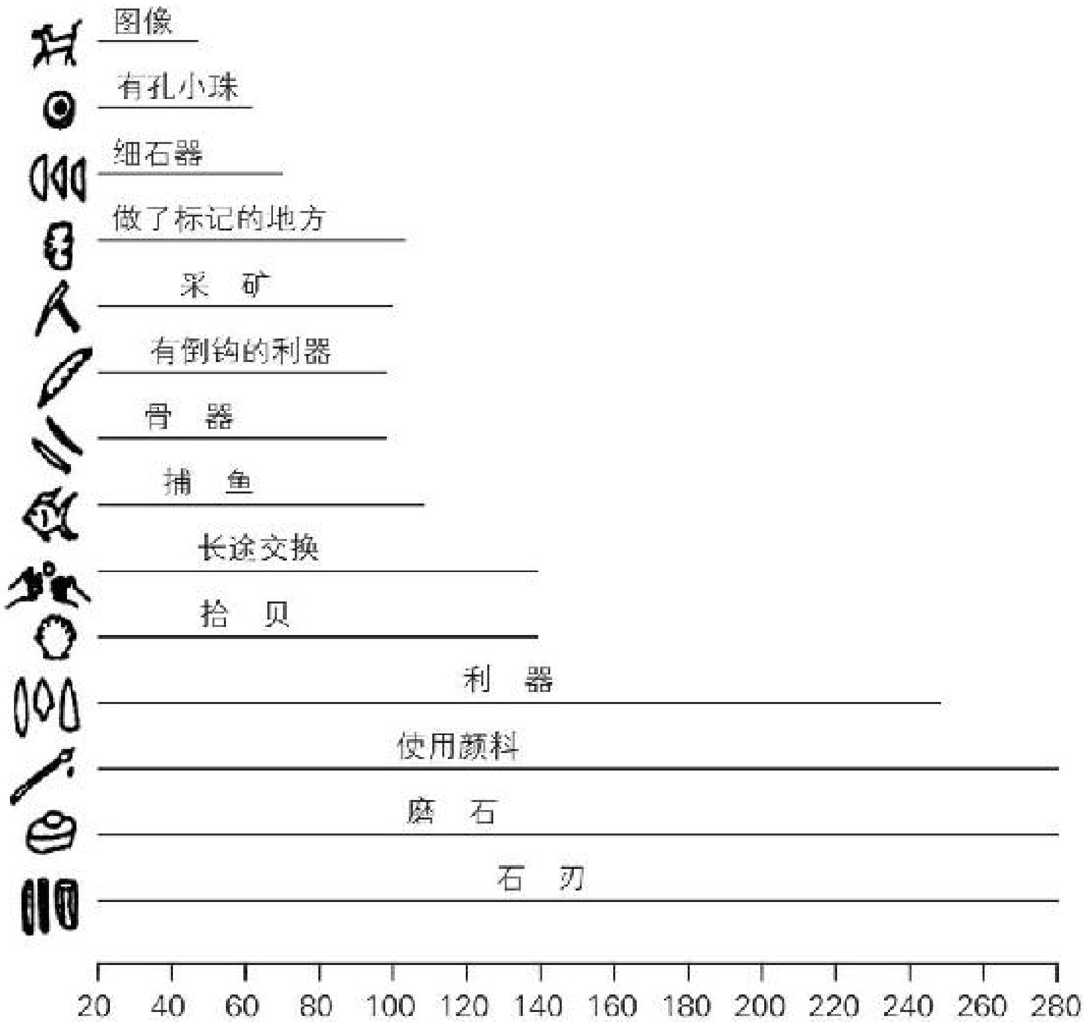
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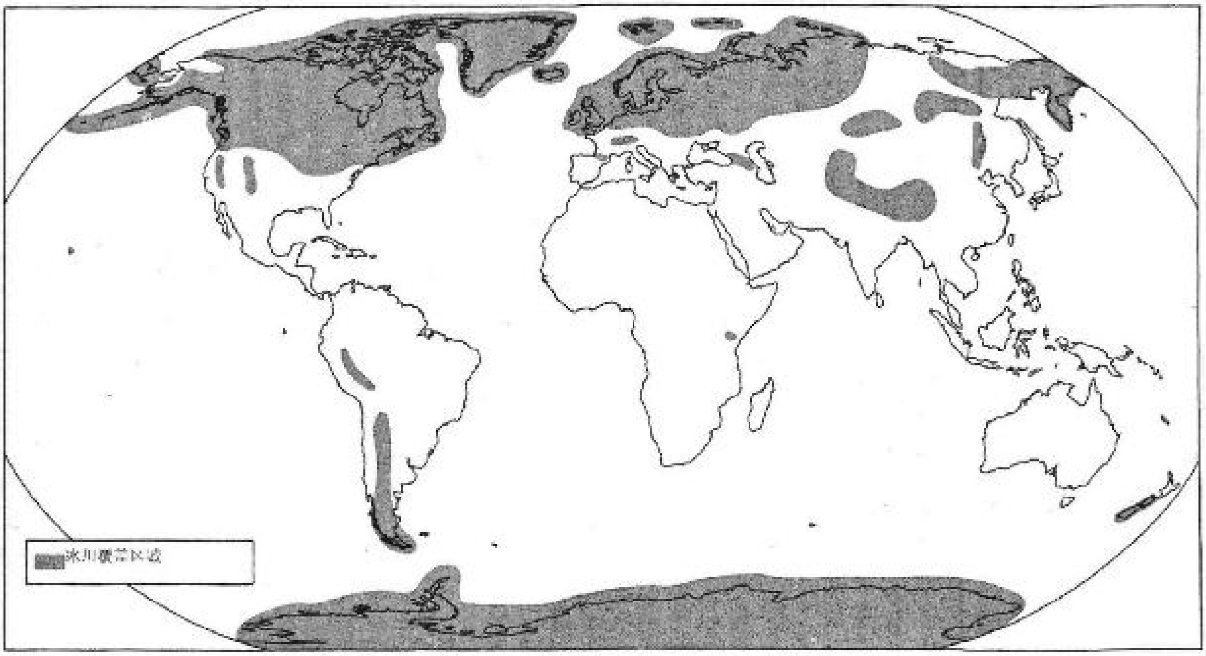
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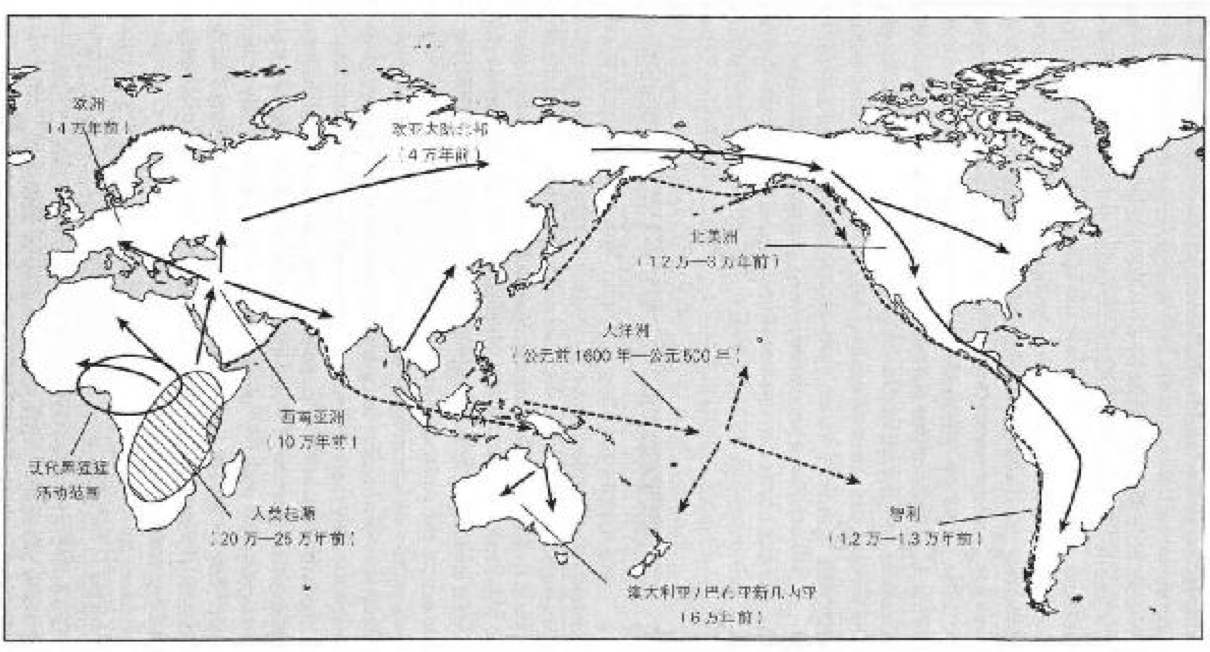
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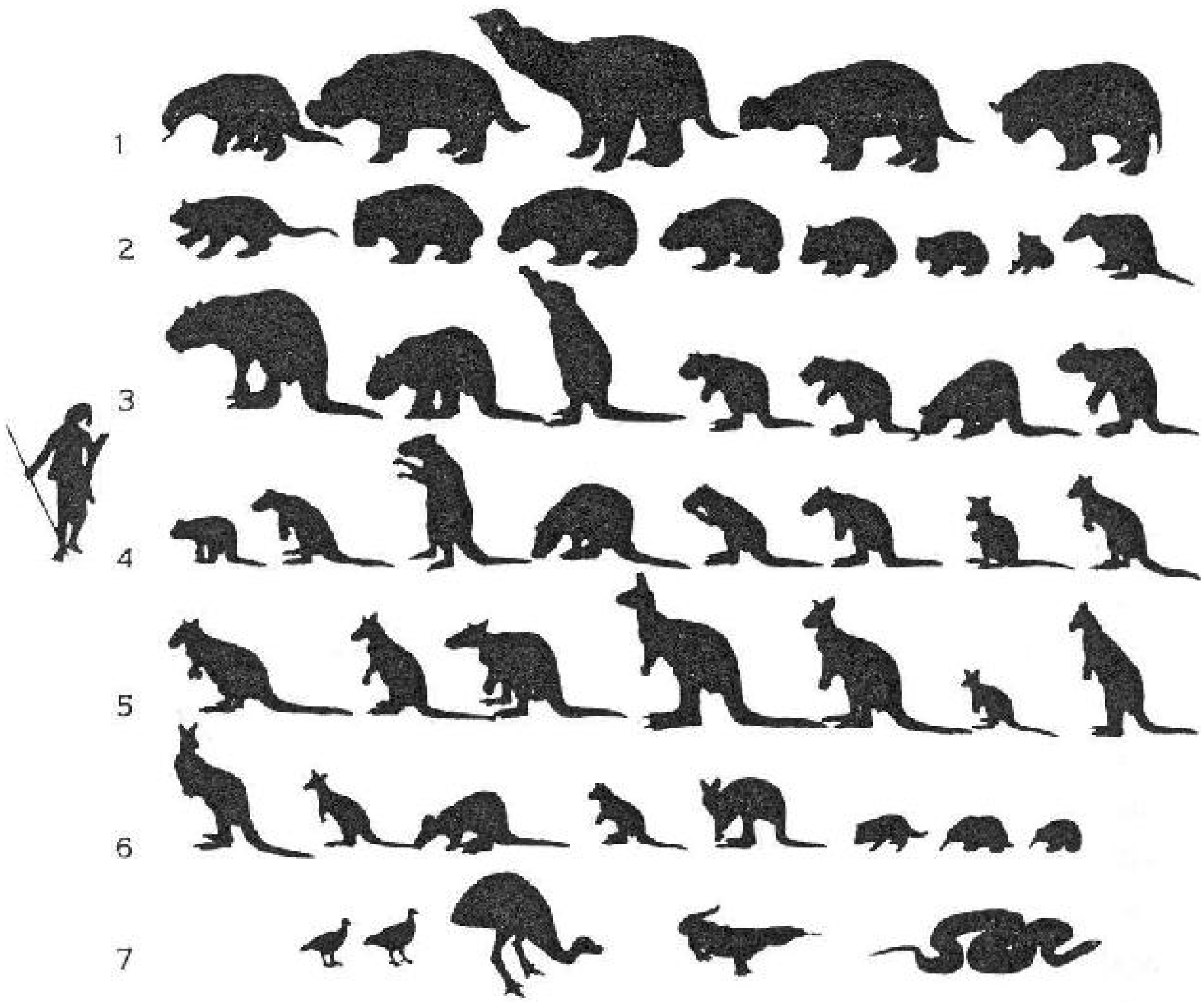
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[17] “[illegible]”[illegible]·[illegible]1963[illegible]·[illegible]W. W. [illegible]2003[illegible]“[illegible]”[illegible]

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[20] [illegible]·[illegible]·W. [illegible]6[illegible]1995[illegible]2[illegible]157—174[illegible]1750[illegible]159[illegible]173[illegible]

[21] [illegible]·W. [illegible]Allen W. Johnson[illegible]·[illegible]Timothy Earle[illegible]2000[illegible]2[illegible]3[illegible]

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[26] [illegible]·R. [illegible]1982[illegible]2[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]·W. [illegible]·[illegible]“[illegible]”[illegible]

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[59] [illegible]4.5[illegible]·[illegible]2001[illegible]189—191[illegible]

[60] [illegible]·[illegible]181[illegible]

[61] [illegible]·G. [illegible]·F. [illegible]·K. [illegible]46000[illegible]2001[illegible]6[illegible]8[illegible]1888—1892[illegible]·[illegible]2001[illegible]6[illegible]8[illegible]1893—1896[illegible]“[illegible]”[illegible]100[illegible]4.6[illegible]

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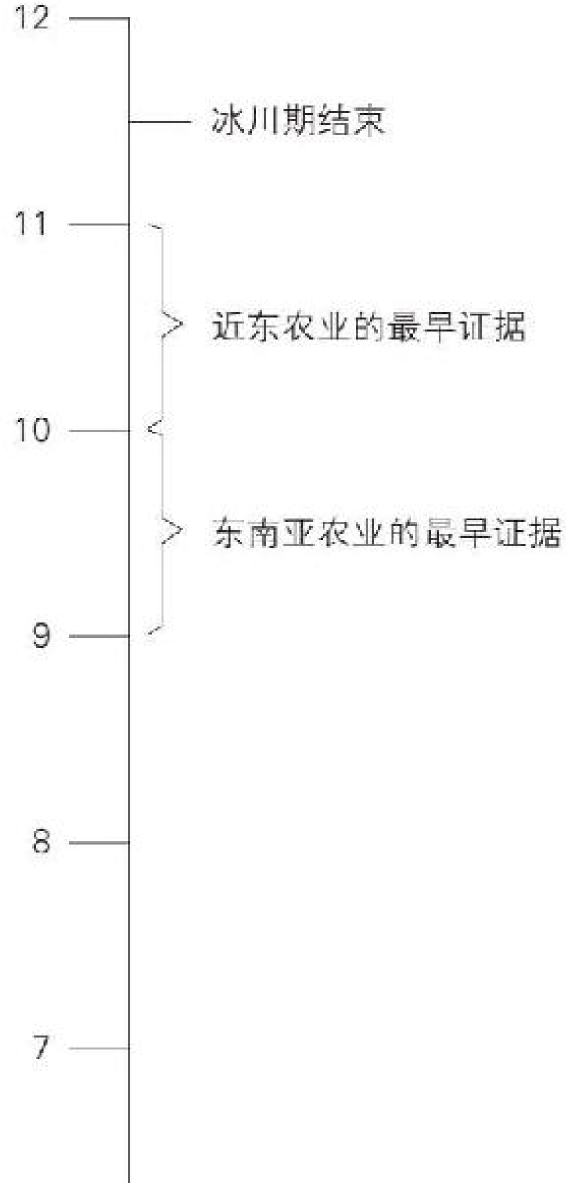
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[64] [illegible]101—104[illegible]

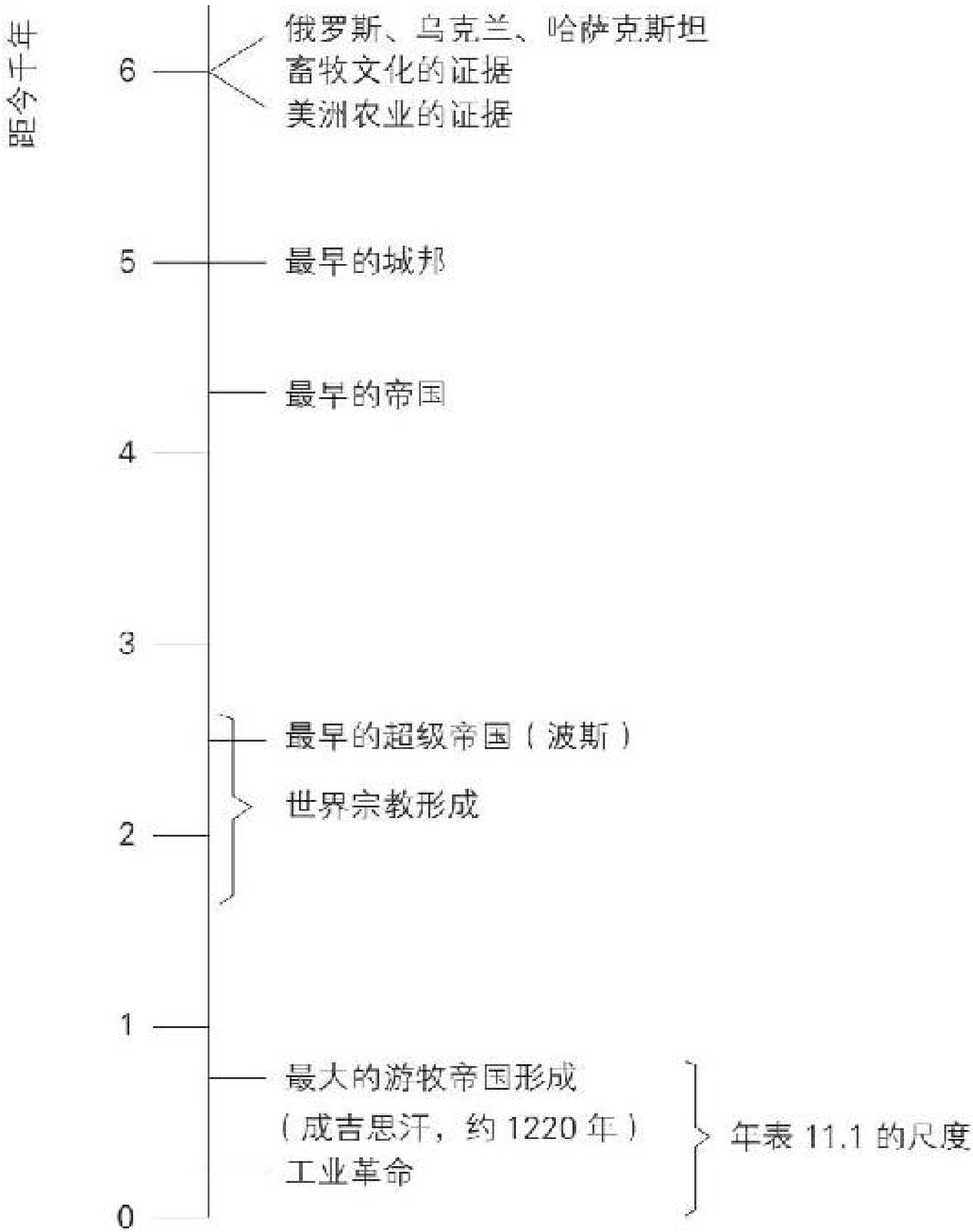
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冰川期结束
11
近东农业的最早证据
10
东南亚农业的最早证据
9
8
7


距今千年
6
俄罗斯、乌克兰、哈萨克斯坦
畜牧文化的证据
美洲农业的证据
5
最早的城邦
最早的帝国
4
3
最早的超级帝国（波斯）
世界宗教形成
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最大的游牧帝国形成
（成吉思汗，约 1220 年）
工业革命
年表 11.1 的尺度
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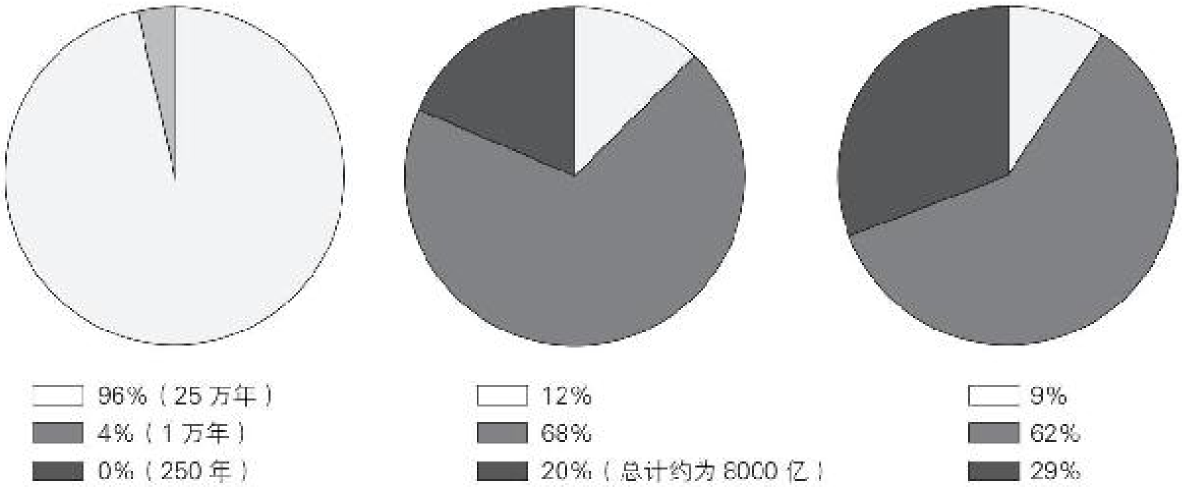
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[illegible]11500[illegible]1[illegible]8.1[illegible]

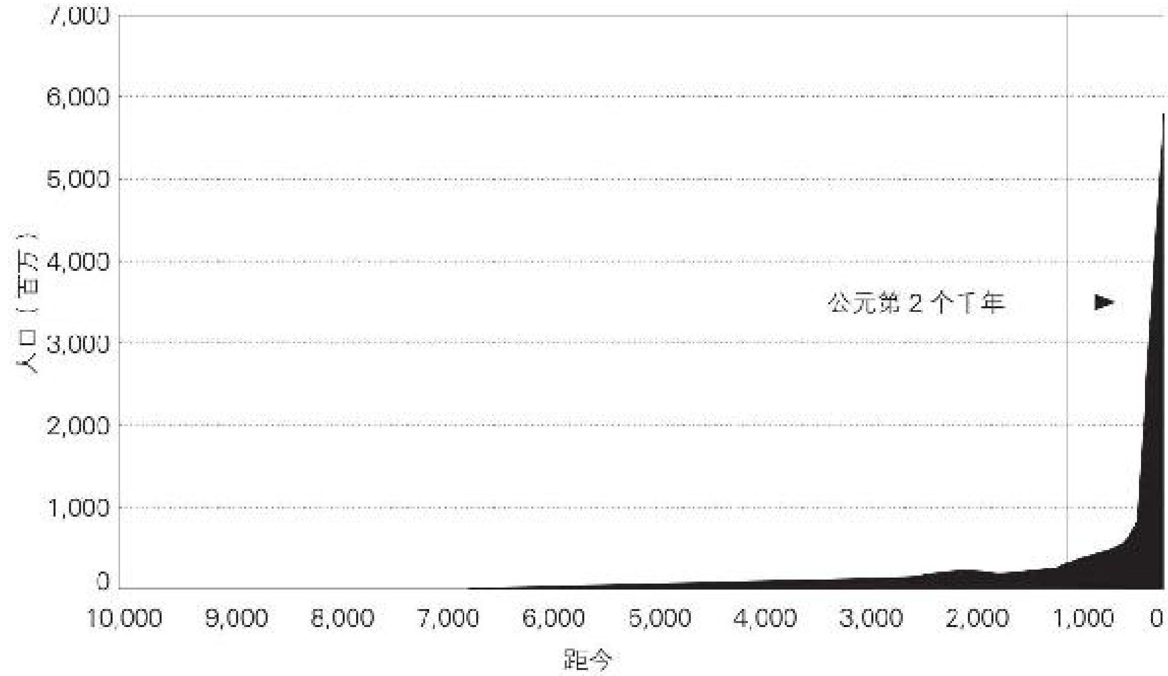
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20[illegible]30[illegible]V.[illegible]·[illegible]“[illegible]”[illegible]1[illegible]8.1[illegible]11500[illegible]4000[illegible]7500[illegible]“[illegible]”[illegible]

[illegible]8.1 [illegible]

时代名称	大致时间段	重要特征
时代1： 许多世界——	距今30万/25万—1万	距今25万/20万—1万年 人类最早适应性的技能；许多小型、联系松散的共同体；人口增长并且扩散；人类进入新的环境，在可居住的地方定居；旧石器时代和人类历史的开端
时代2：儿个世界	距今10000—500年	集约化和密集的、相互联系的居住点；逐渐增长的适应方式、新型的共同体、逐渐增长的人造环境、逐渐增长的人口；三种分离的世界区，以类似的轨迹、信息交换的不同协同方式制约下的不同速度发展
时代3：一个世界	500年前—现在	单一的、全球化体系；不同层次的集体的知识；加速索取资源；控制生物圈的资源；其他生物体灭绝

[illegible] 10 000 [illegible] 11 000 [illegible] 5000 [illegible] 6000 [illegible] 20 [illegible]

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[illegible]25 000[illegible]18 000[illegible]18 000[illegible]13 000—11 500[illegible]11 500[illegible]

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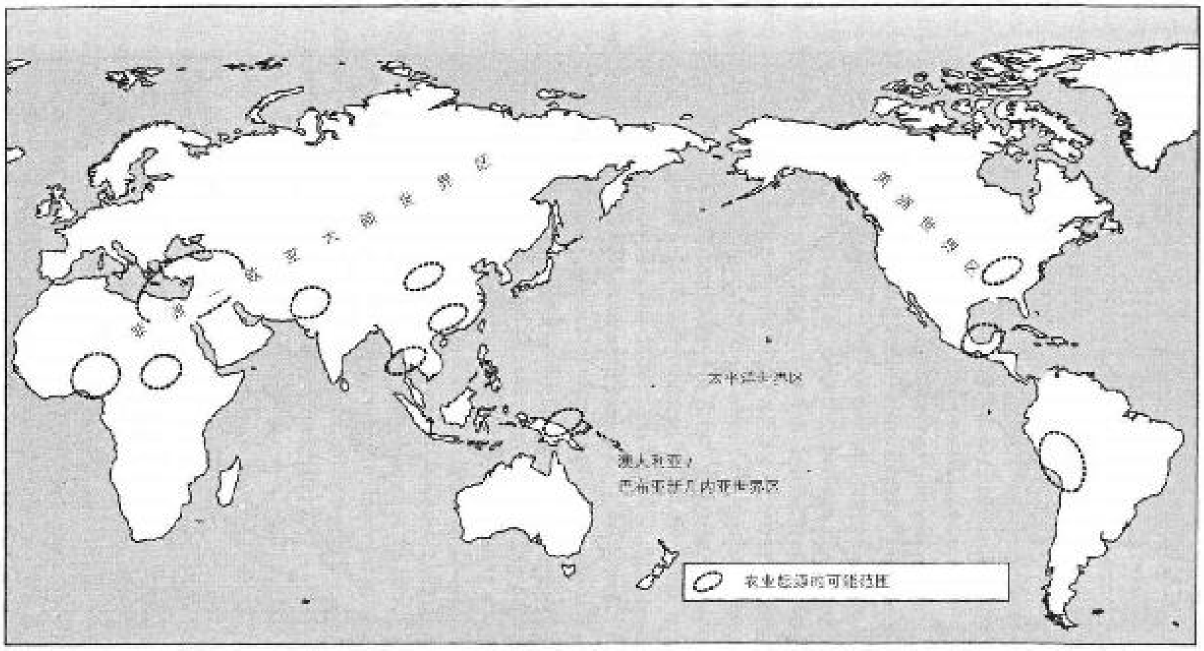
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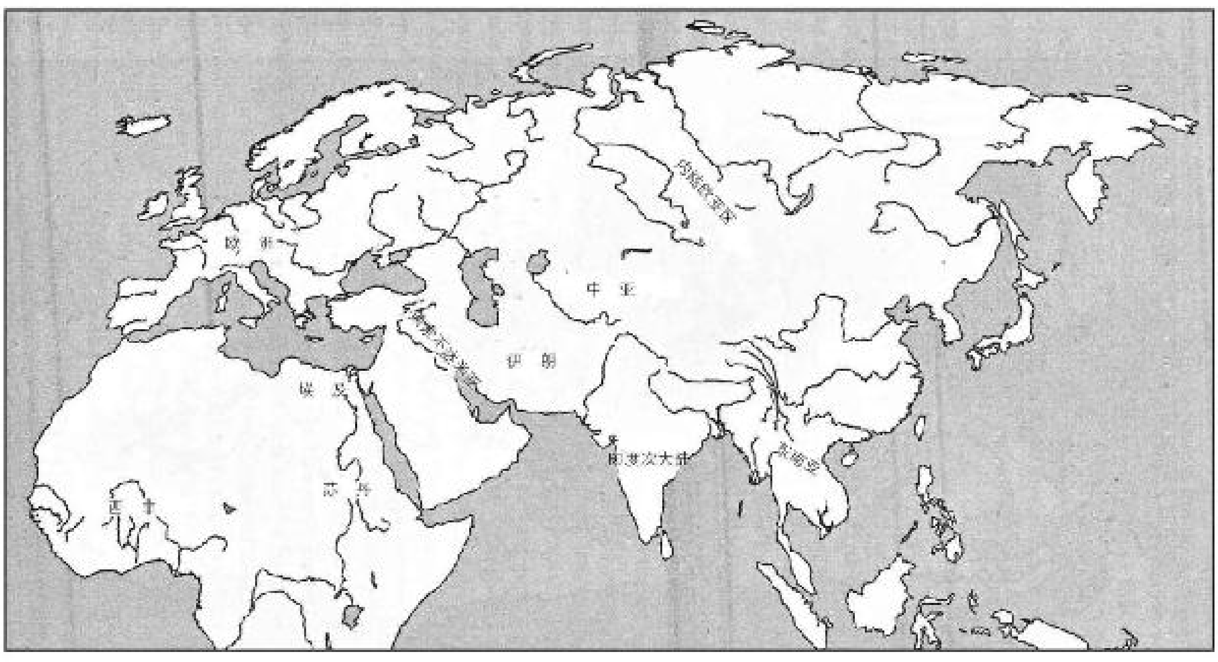
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[illegible]“[illegible]”[illegible][8][illegible][9][illegible]—[illegible]4000[illegible]·[illegible]Joseph Greenberg[illegible][10]



8.1



8.2 —

[illegible][11]

[illegible]

[illegible]“[illegible]”[illegible]

[illegible]

[illegible]——[illegible][12]

[illegible]——[illegible]

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[illegible][13][illegible]·[illegible]Bruce Smith[illegible]

[illegible]“[illegible]”[illegible][14][illegible]“[illegible]”[illegible]

[illegible]

[illegible]90%[illegible]

[illegible]8.2[illegible]

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[illegible]8.2[illegible]9000[illegible]5000[illegible]6000[illegible][15]

[illegible]8.2 [illegible]

时间（距今1000年）	西南亚	中亚 / 东亚	非洲	美洲
13—12				狗
12—11	狗、山羊、绵羊			
11—10	二粒 / 单粒小麦、大麦、豌豆和绿豆、猪			
10—9	黑麦、牛			葫芦、南瓜
9—8	亚麻			胡椒、牛油果、豆
8—7	狐尾草、葫芦、狗			玉米、伊拉玛[2]/羊驼
7—6	枣椰、葡萄	荸荠、普通小麦、桑树、稻、水牛	龙爪粟	
6—5	橄榄、驴子	马、牛（瘤牛）、洋葱	油棕、高粱	棉花
5—4	甜瓜、韭葱、橡子	骆驼（大夏型）	山药？豇豆	花生、甘薯
4—3	骆驼（单峰）	大蒜	猫、珍珠、小米	豚鼠、木薯
3—2				土豆、火鸡
2—1				菠萝、烟草

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[illegible]20[illegible]·[illegible]“[illegible]……[illegible]”[24]

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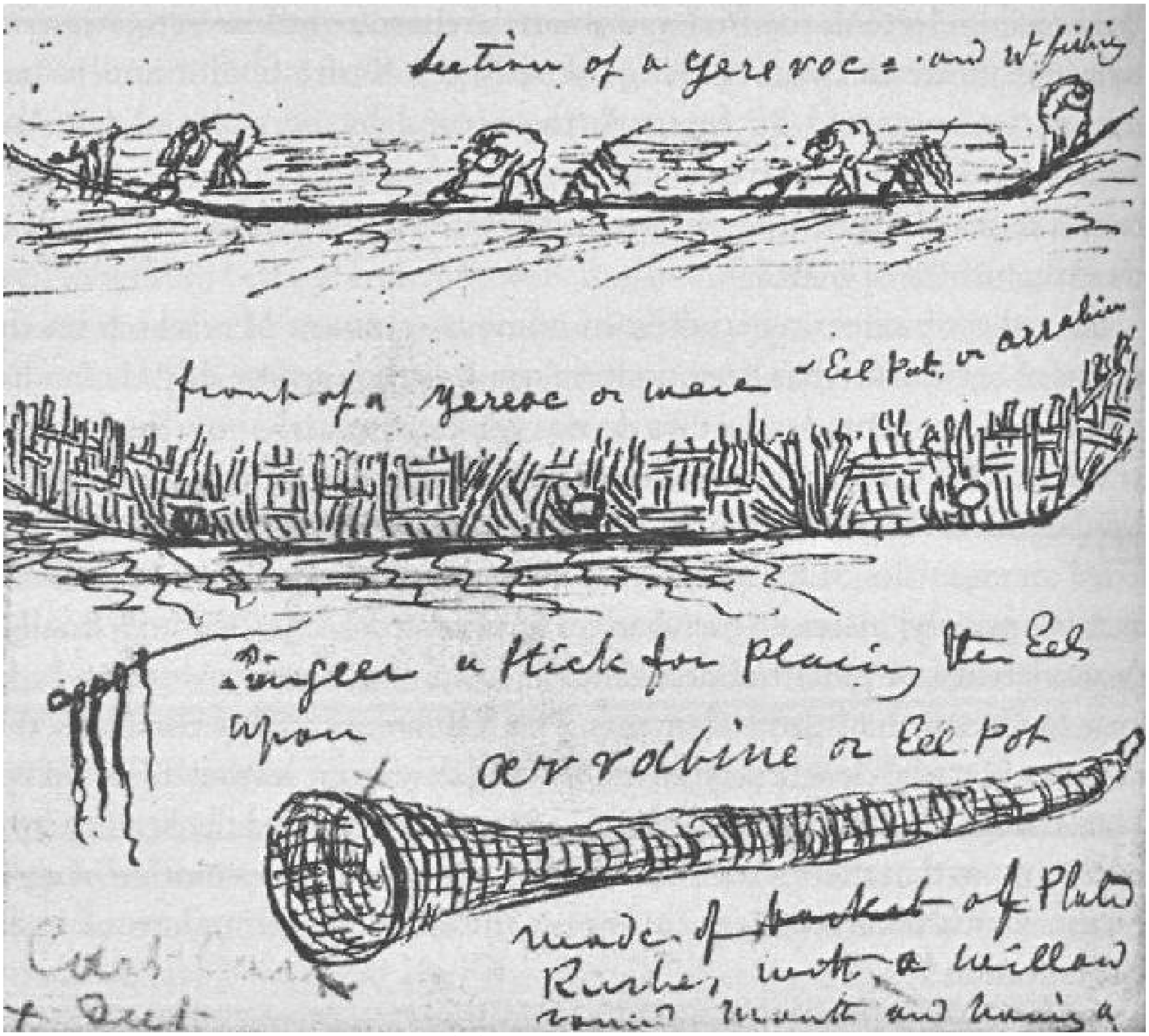
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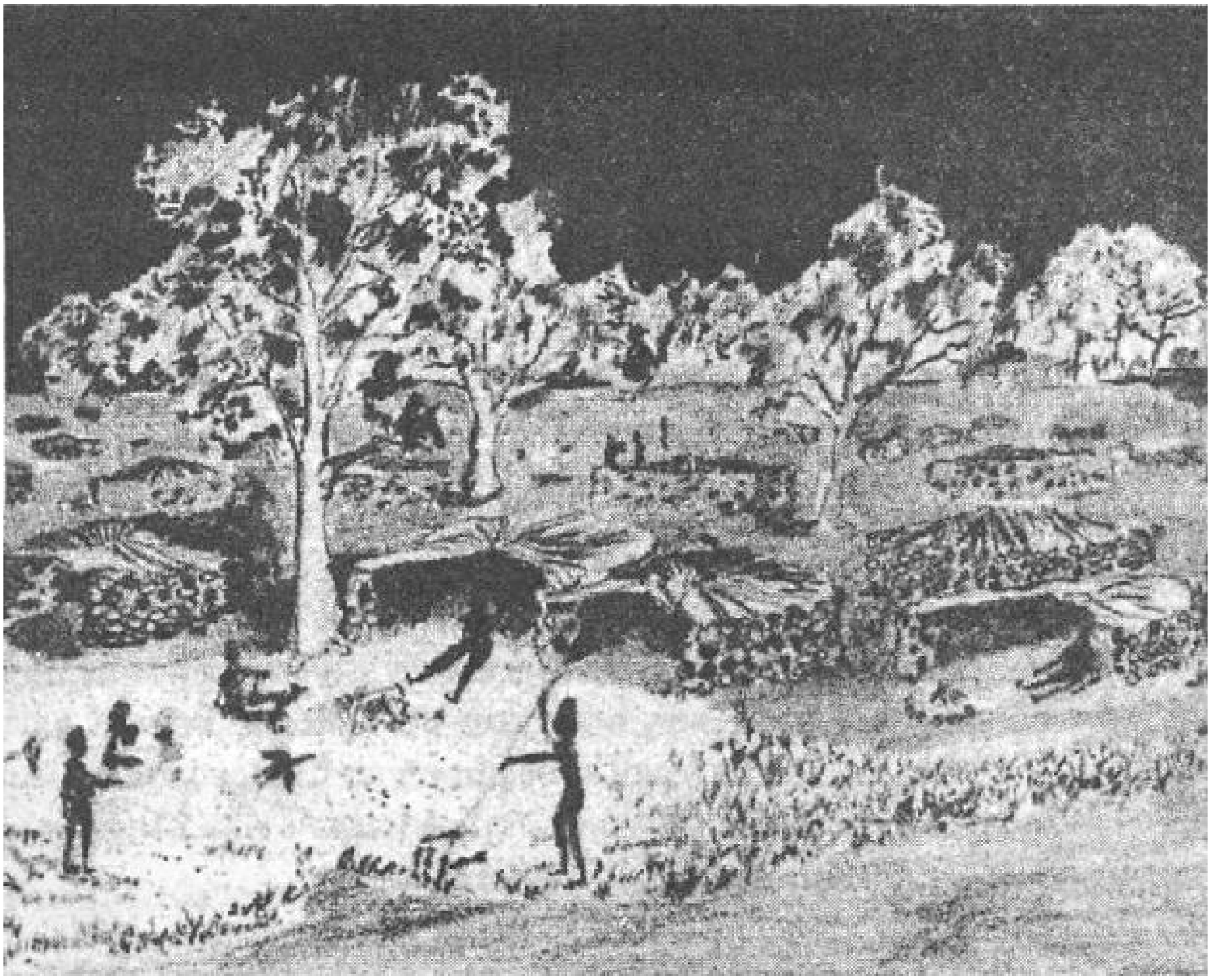
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[illegible]·[illegible]Ester Poserup[illegible]·[illegible]“[illegible]”[illegible][49][illegible]—[illegible][50][illegible]·[illegible]Paul Bairoch[illegible]“[illegible]860[illegible]560[illegible]50[illegible][51]”

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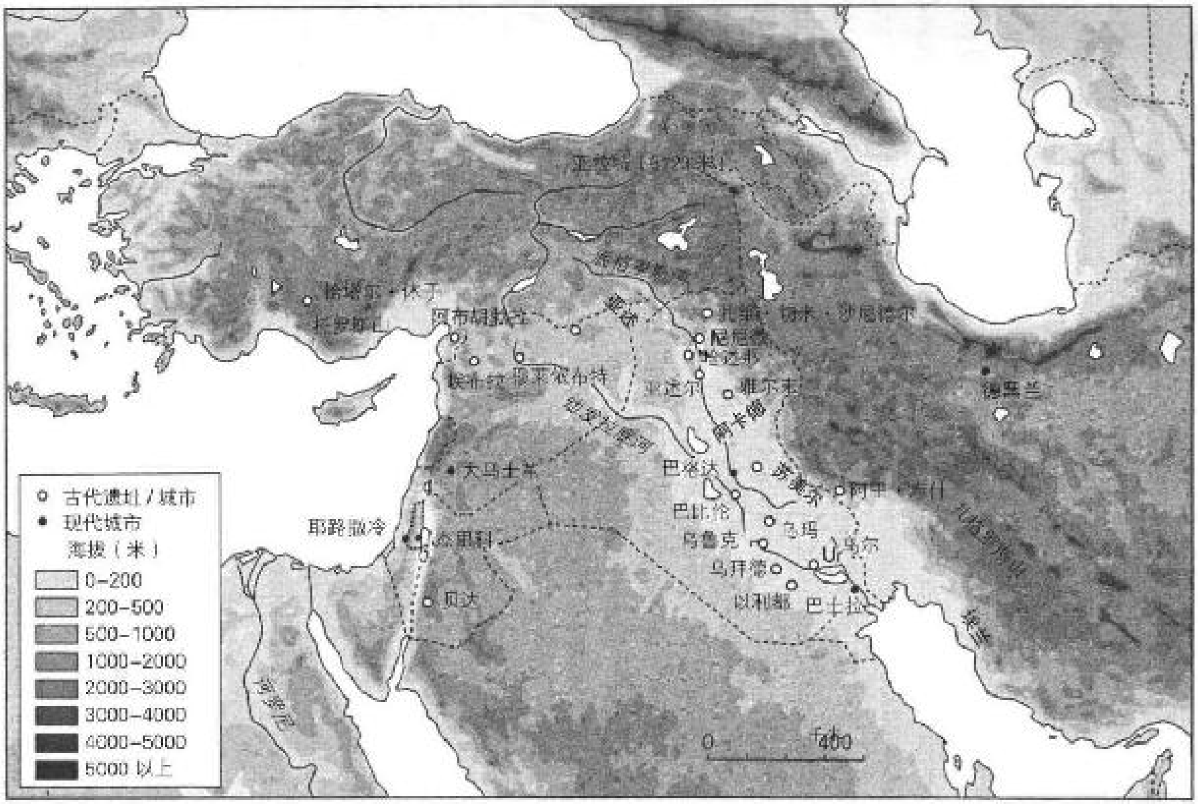
[illegible]10 500[illegible]Abu Hureyra[illegible][56][illegible]10 500[illegible]10 500[illegible]300—400[illegible]9700[illegible]9000[illegible][57][illegible]8.3[illegible]

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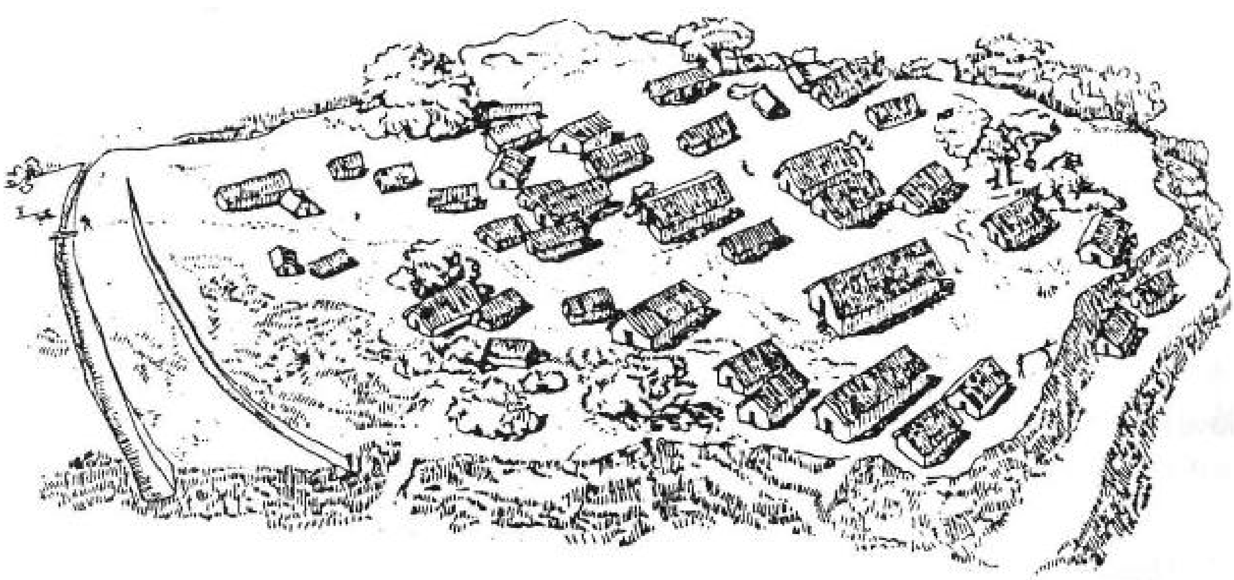
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[illegible]8.5 [illegible]

[illegible]Kolomiyshchina[illegible]·[illegible]Marija Gimbutas[illegible]·[illegible]Joan Marler[illegible]1991[illegible]106[illegible]

[illegible]

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[illegible]（Tripoplye[illegible]·[illegible][62][illegible]

[illegible]

[illegible]——[illegible]·[illegible]——[illegible]——[illegible]

[illegible]“[illegible]”[illegible]

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[illegible][65][illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]·[illegible]1995[illegible]·[illegible]John Mears[illegible]2001[illegible]·[illegible]·[illegible]1984[illegible]·[illegible]1998[illegible]·[illegible]1989[illegible]·[illegible]Richard MacNeish[illegible]1992[illegible]·[illegible]Göran Burenhult[illegible]5[illegible]1993—1994[illegible]·[illegible]3[illegible]1990[illegible]·[illegible]1991[illegible]·[illegible]Margaret Ehrenberg[illegible]1989[illegible]·[illegible]1998[illegible]·[illegible]Clive Poting[illegible]I. G. [illegible]1996[illegible]·[illegible]1995[illegible]·[illegible]·[illegible]Johan Kamminga[illegible]1983[illegible]·[illegible]1983[illegible]

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[1] [illegible]·R. [illegible]W. W. [illegible]2001[illegible]93[illegible]

[2] [illegible]·[illegible]Colin Renfrew[illegible]1989[illegible]125[illegible]·[illegible]——[illegible]26—27[illegible]

[3] J. R. [illegible]Biraben[illegible]4[illegible]1979[illegible]23[illegible]

[4] [illegible]·[illegible]2[illegible]1998[illegible]4[illegible]

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[6] [illegible]·[illegible]Josephine Flood[illegible]1983[illegible]222—293[illegible]

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[24] [illegible]5[illegible]

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[61] □□□·R. □□□□□□□□□□□□□□□□□□□□2□□□□□□□□□□□1971□□□□□□□□□□□·W. □□□□Allen W. Johnson□□□□□□·□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□2□□□□□□□□□□□□□□□□2000□□□□32—35□□

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[63] □□□□I. G. Simmons□□□□□□□□□□□□□□□□□□□□□□□2□□□□□□□□□□□□1996□□□□94□□

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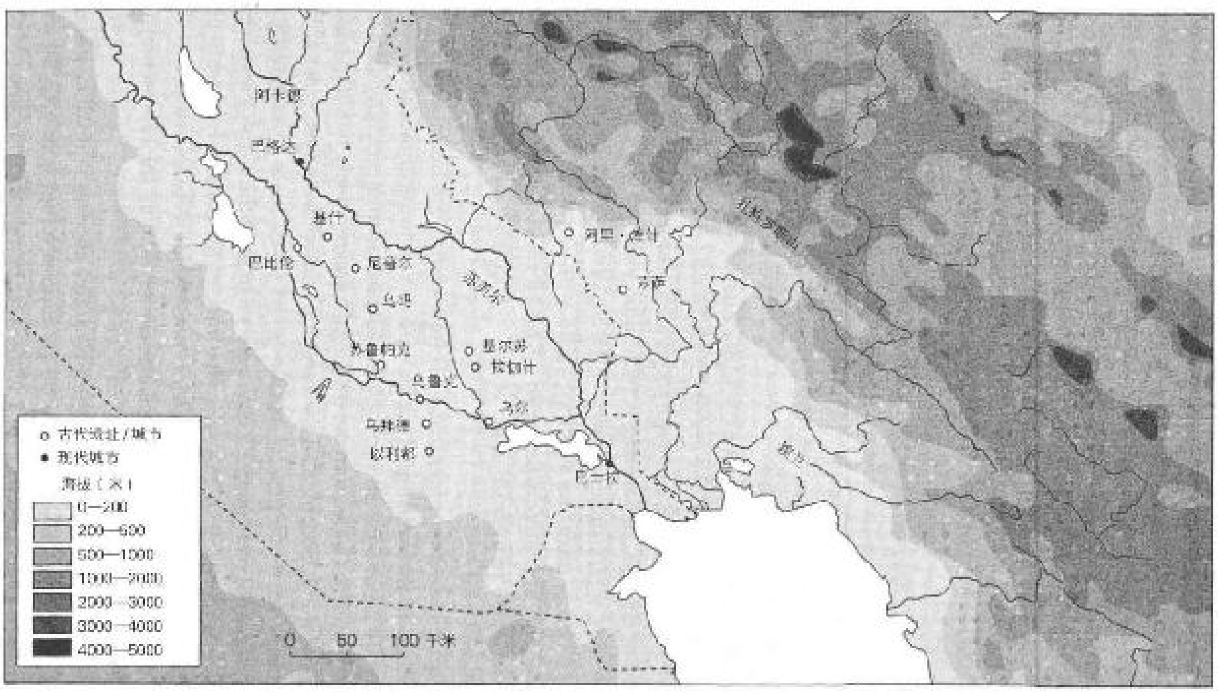
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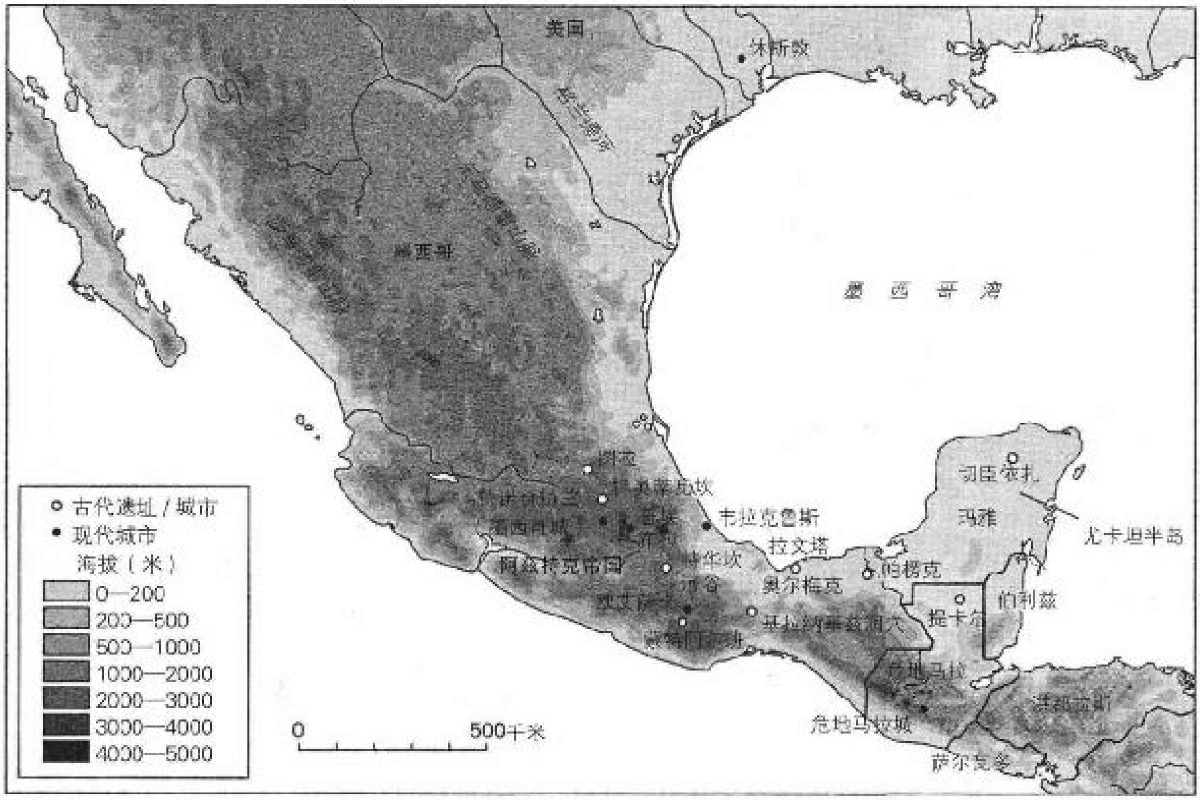
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基什
巴比伦
尼普尔
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吉尔苏
拉伽什
乌鲁克
乌尔
埃利都
苏萨
古代遗址/城市
现代城市
海拔（米）
0—200
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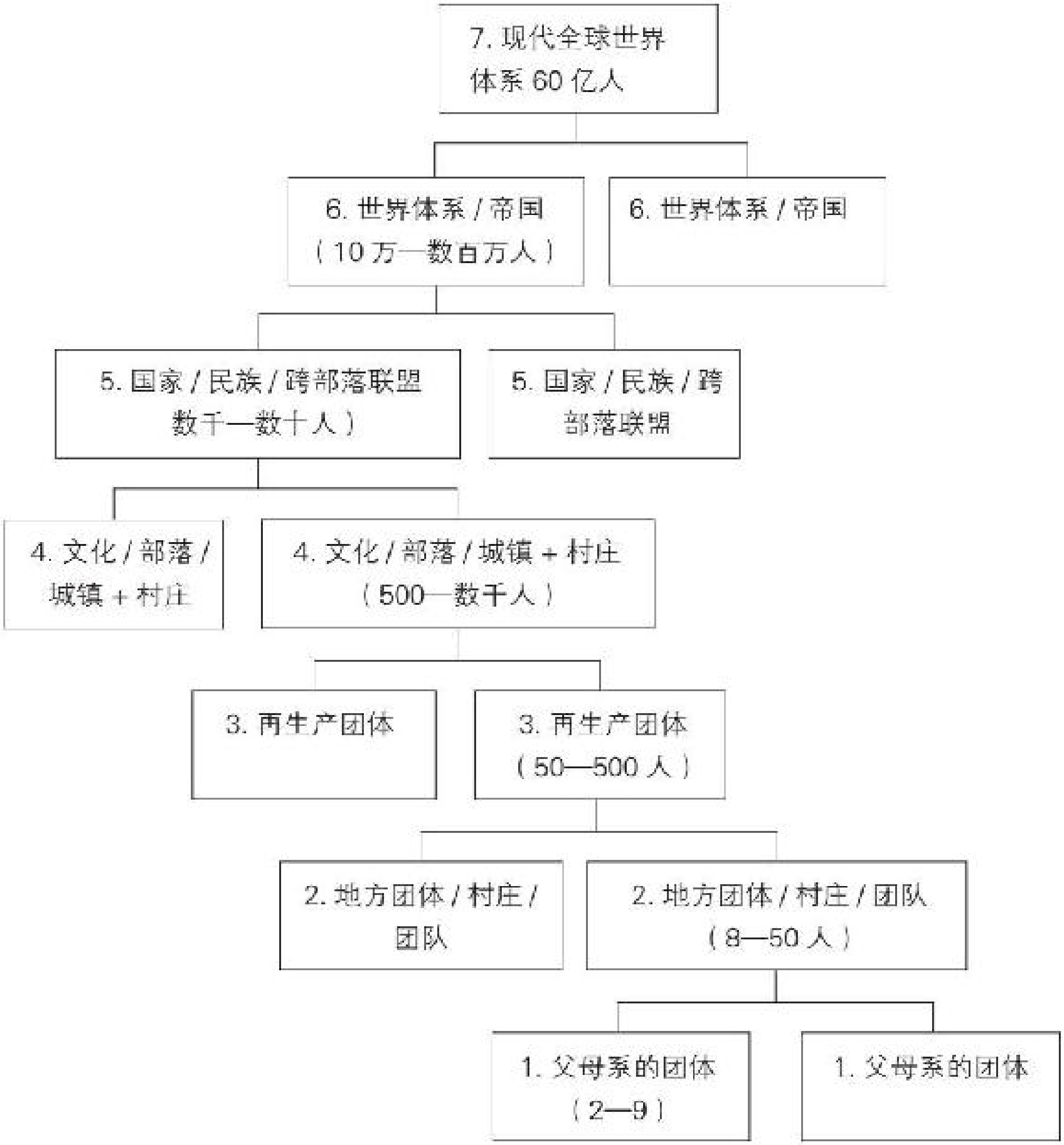


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[illegible]9.1 [illegible]

层级	社会结构的类型与范围	规模
7	现代全球化体系：涵盖全部以影响力、财富和权力组成等级形态的社会	60 亿
6	世界体系和帝国：涵盖文化上、经济上、有时政治上相互联系的大片地区	数十万到数百万
5	国家／民族／城市／跨氏族的组织：大型的、经济上和军事上强大的体系，数千 - 数十万以上具备国家的或者近似国家的结构	数千到数万
4	文化／部落／城镇和周边农村：相互联系的生产团体，有时有一个领袖，如“大人”或者“首领”	500—数千
3	再生产团体／村庄群：相关的地方组织，其成员经常通婚，在稀疏的亲属和文化上有共同的意识	50—500 人
2	地方的或者独立的团体／村庄／团队／宿营团体：若干个父母系的团体，亲密地在一起生活、迁移	8—50 人
1	父母系的团体：父母和孩子，经常与父亲在一起，共同居住	2—8 人



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□□□congestion□□□□□□□□□□□[4]□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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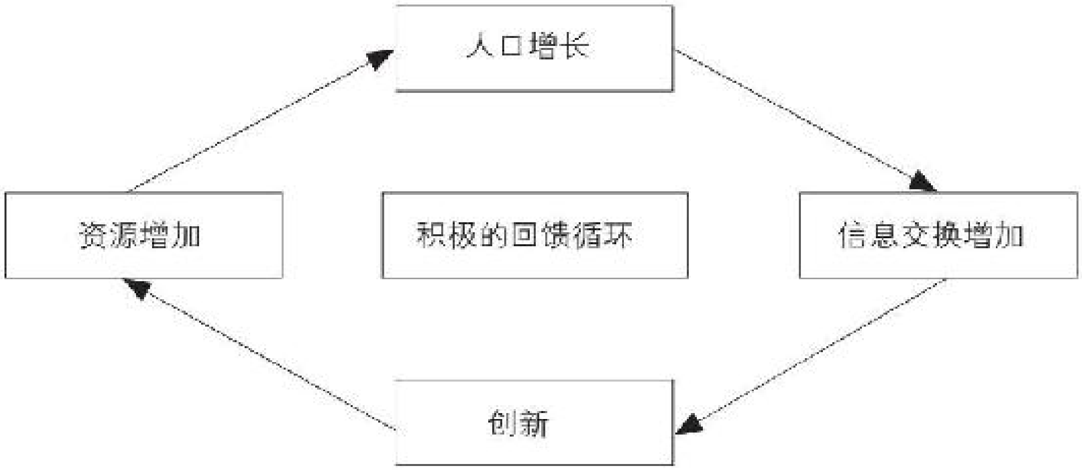
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[illegible]—[illegible]“[illegible]”[illegible]9.2[illegible]

[illegible]9.2 [illegible]

	能量投入（千兆焦耳／公顷）	食物收获千兆焦耳／公顷）	人口密度（千兆焦耳／公顷）
采集	0.001	0.003—0.006	0.01—0.9
游牧社会	0.01	0.03—0.05	0.8—2.7
轮作	0.04—1.5	10.0—25	1—60
传统农业	0.5—2	10—35	100—950
现代农业	5—60	29—100	800—2000

[illegible]I. G. [illegible]1993[illegible]37[illegible]

[illegible]

[illegible][9][illegible][10][illegible]20—50[illegible]20%[illegible]50[illegible]40[illegible]32—35%[illegible]4—6%[illegible][11]

“[illegible]”

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[illegible]·[illegible]5000——[illegible]3000[illegible][12][illegible]“[illegible]”[illegible]

[illegible]5000——[illegible]4000[illegible]—[illegible]——[illegible]——[illegible]500—700[illegible]75[illegible][13][illegible]

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[illegible]4000[illegible]1000[illegible]

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[illegible]5000[illegible]10000[illegible]——5000[illegible]600[illegible]5000[illegible]

[illegible]·[illegible]（Robert J. Wenke）[illegible]“[illegible]‘[illegible]’[illegible]。”[18]

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[illegible]·[illegible]John Goatsworth[illegible]“[illegible]……[illegible]1800[illegible]……[illegible]12.5[illegible]”[19]

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[illegible]70[illegible]120[illegible]120[illegible][20][illegible]——[illegible]

[illegible]1000—3000[illegible]

[illegible]Tripoplye[illegible]4000[illegible]

[illegible][21][illegible]——[illegible]

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[illegible]“[illegible]”[illegible]big man[illegible]20[illegible]·[illegible]Bougainville[illegible]mumi[illegible]·[illegible]“[illegible]1939[illegible]1[illegible]10[illegible]1100[illegible]32[illegible]‘[illegible]’[illegible]”[25][illegible]

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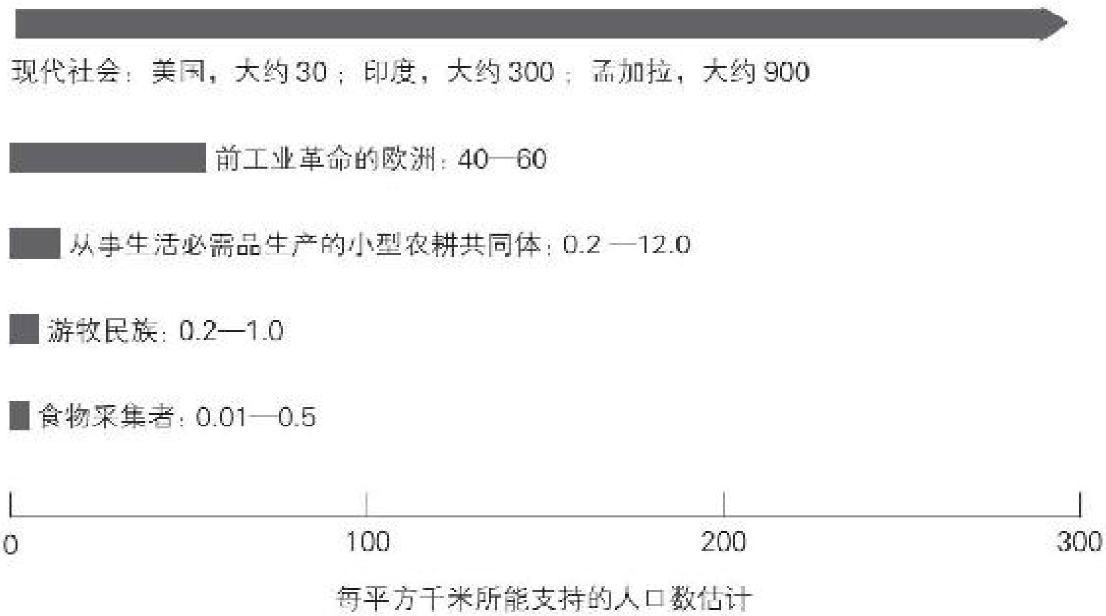
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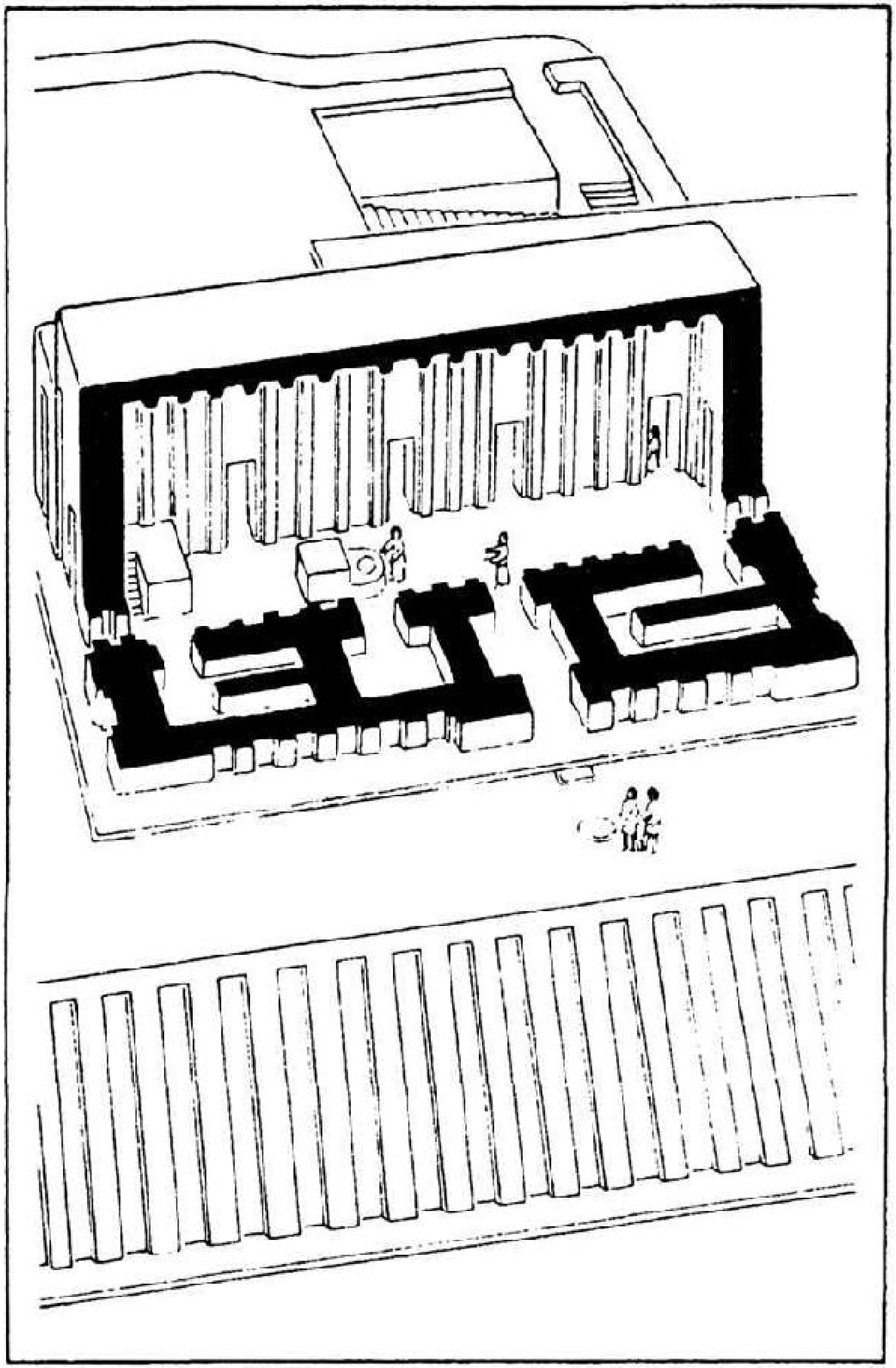
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[illegible]A. [illegible]·[illegible]Bernard Knapp[illegible]1988[illegible]44[illegible]·[illegible]·[illegible]Helen and Richard Leacroft[illegible]1974[illegible]

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[illegible][32][illegible][33]

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[illegible]·[illegible]Bunyoro[illegible]19[illegible]mukama[illegible][35][illegible]10[illegible]“[illegible]”[illegible]

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> [illegible]……[illegible][37]

[illegible]·[illegible]Constantine Porphyrogenitus[illegible]913—959[illegible]“[illegible]”[illegible]’druzhiny[illegible]

> [illegible]“[illegible]”[illegible]Vervians[illegible]Drugovichians[illegible]

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[illegible] 2000 [illegible][44] [illegible] —— [illegible] · [illegible] Leonard Woolley [illegible] —— [illegible][45] [illegible]

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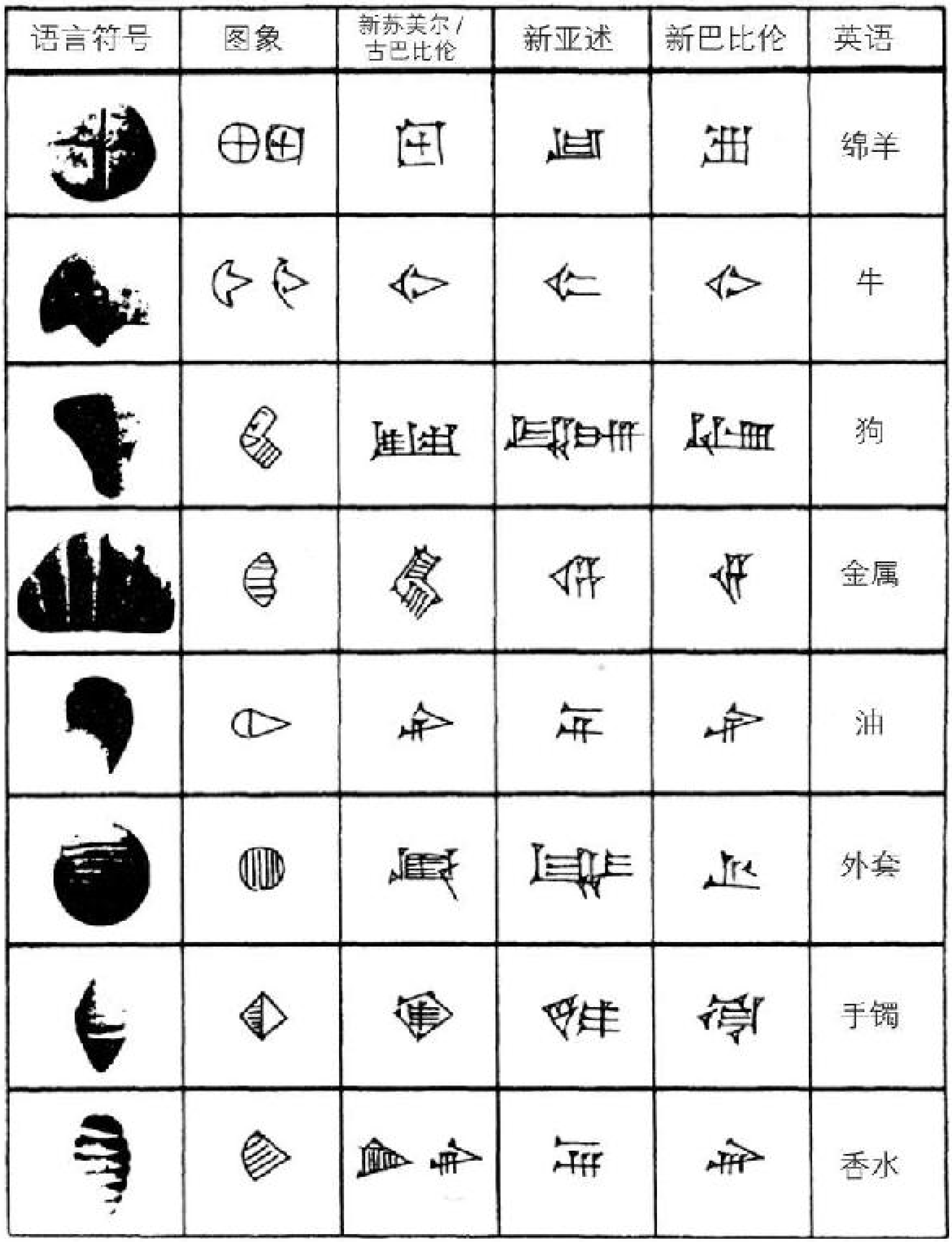
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[illegible]9.5 [illegible]

[illegible]A.[illegible]·[illegible]Bernard Knapp[illegible]1988[illegible]55[illegible]

[illegible]

[illegible]600[illegible]quipu[illegible]——[illegible]

[illegible]Umma[illegible]Girsu[illegible]Lagash[illegible][48][illegible]·[illegible][49]

“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]9. 3[illegible]“[illegible]”[illegible]·[illegible]“[illegible]‘[illegible]’[illegible]”[50]

[illegible]9.3 [illegible]

技术／生活方式	生产方式	特征	流行时代
采集社会	亲属制度	旧石器时代的主要技术使用石制工具，以采集植物为其生活方式；规模小（其组织程度仅及第 3 层，* 但是在某些区域性的文化和跨部落体系中有第 4 层的某些特征	旧石器时代：全世界距今大约 10 000 年；某些地区至今尚存
农业社会（早期农业社会）	亲属制度	农业时代的主要技术基于种植和畜牧；养活小规模的、前国家社会（达到第 4 层）；和……	农业时代：距今约 10000 早期农业时代：距今约 5000 年前，某些地区至今尚存
农业社会（农耕文明）	收取贡赋	大型社会，组织形式为城市和国家（达到第 6 层）；人口增速加快，但周期性发生人口危机；新石器时代典型的生活方式为游牧文化	后农业时代：距今大约 5000—200 年；某些地区出现甚晚
现代社会	资本主义	现代主要技术为现代科学；能够支持全球体系（第 7 层）；前所未有的人口增长	现代：始于大约公元 1750 年

* [illegible]9.1[illegible]9.1[illegible]

[illegible]—[illegible]

[illegible]2000[illegible]2500[illegible][51][illegible]

[illegible]

[illegible] La Venta and San Lorenzo [illegible] 33 [illegible] 80 [illegible] 18 000 [illegible][52] [illegible] 80 [illegible][53] [illegible]

[illegible] 500 [illegible] Oaxaca [illegible] 1300 [illegible] 1000 [illegible] 600 [illegible] Monte Alban [illegible] 400 [illegible] 7 [illegible] 4000 [illegible] 200 [illegible] 12 [illegible] 200 [illegible]——700 [illegible] 17 000 [illegible][54]

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[1] [illegible]·[illegible]"[illegible]"[illegible]"[illegible]"[illegible]2[illegible]——[illegible]7[illegible]

[2] [illegible]·[illegible]·[illegible]1978[illegible]102[illegible]

[3] [illegible]·W. [illegible]·[illegible]2000[illegible]32[illegible]36[illegible]·M. [illegible]10[illegible]·[illegible]2001[illegible]368—385[illegible]

[4] [illegible]"[illegible]"[illegible]2[illegible]

[5] [illegible]·[illegible]·[illegible]40[illegible]1987[illegible]130[illegible]

[6] [illegible]·[illegible]1000[illegible]1982[illegible]VII[illegible]

[7] [illegible]·[illegible]1974[illegible]C. [illegible]C. Tickell[illegible]·[illegible]1997[illegible]450[illegible]

[8] [illegible]"[illegible]"[illegible]14[illegible]·[illegible]2000[illegible]4[illegible]5[illegible]

[9] [illegible]·[illegible]2[illegible]1998[illegible]112[illegible]

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[11] [illegible]52[illegible]

[12] [illegible]·[illegible]·[illegible]·[illegible]Ian Hedder[illegible]·[illegible]Glynn Issac[illegible]·[illegible]Norman Hammond[illegible]1981[illegible]261—305[illegible]1983[illegible]1997[illegible]199—228[illegible]

[13] I. G . [illegible]——[illegible]2[illegible]1998[illegible]4[illegible]11[illegible]1[illegible]2000[illegible]1—26[illegible]

[14] [illegible]·[illegible]1998[illegible]4[illegible]11[illegible]1[illegible]2000[illegible]1—26[illegible]

[15] [illegible]·[illegible]1989[illegible]99[illegible]99—107[illegible]·[illegible]·[illegible]20 000[illegible]——[illegible]W. W. [illegible]1994[illegible]97—98[illegible]

[16] [illegible]—[illegible]·[illegible]1998[illegible]18[illegible]

[17] [illegible]·[illegible]1700[illegible]70%[illegible]·R. [illegible]W. W. [illegible]2000[illegible]11[illegible]

[18] [illegible]·J. [illegible]3000[illegible]3[illegible]1990[illegible]336[illegible]

[19] [illegible]·[illegible]101[illegible]1[illegible]1996[illegible]2[illegible]6—7[illegible]

[20] [illegible]1[illegible]129—31[illegible]

[21] [illegible]18%[illegible]10%[illegible]·R. [illegible]11—12[illegible]

[22] [illegible]20 000[illegible]29—33[illegible]

[23] [illegible]·[illegible]“[illegible]”[illegible]A[illegible]B[illegible]“[illegible]”[illegible]1[illegible]1760[illegible]1986[illegible]

[24] [illegible]“[illegible]”[illegible]1[illegible]53[illegible]

[25] [illegible]106[illegible]

[26] [illegible]109[illegible]

[27] [illegible]·[illegible]·[illegible]Hans Jörg Nissen[illegible]1988[illegible]·[illegible]Elizabeth Lutzeier[illegible]·J. [illegible]Northcott[illegible]·[illegible]Susan Pollock[illegible]1999[illegible]D. T. [illegible]Potts[illegible]1997[illegible]

[28] [illegible]·[illegible]3[illegible]1[illegible]1995[illegible]17[illegible]

[29] [illegible]·[illegible]19[illegible]“[illegible]‘[illegible]’[illegible]……[illegible]”[illegible]

[30] [illegible]·[illegible]Christopher Ehret[illegible]2001[illegible]244—245[illegible]

[31] [illegible]55—61[illegible]67—73[illegible]

[32] [illegible]·[illegible]2[illegible]1995[illegible]96[illegible]·[illegible]Lewis Mumford[illegible]

[33] [illegible]·G . [illegible]Bruce G. Trigger[illegible]1993[illegible]8—44[illegible]

[34] [illegible]·[illegible]“[illegible]”[illegible] [illegible]——[illegible]20[illegible]

[35] [illegible]113—115[illegible]

[36] [illegible]·[illegible]Valeri Hansen[illegible]1600[illegible]W. W. [illegible]2000[illegible]35[illegible]

[37] [illegible]·[illegible]·[illegible]Samuel Hazzard Cross[illegible]·P. [illegible]——[illegible]Olgerd P. Sherbovitz-Wetzor[illegible]1953[illegible]122[illegible]994—996[illegible]

[38] [illegible]·[illegible]G . [illegible]Moravcsik[illegible]R. J. H. [illegible]Jenkins[illegible]1967[illegible]1.63[illegible]

[39] [illegible]·[illegible]990—1992[illegible]1992[illegible]1—2[illegible]·[illegible]

[40] [illegible]·R. [illegible]12[illegible]

[41] “[illegible]‘[illegible]’[illegible]”[illegible]——[illegible]58[illegible]

[42] [illegible]104[illegible]

[43] [illegible]——[illegible]57[illegible]“[illegible]”[illegible]60[illegible]

[44] [illegible]80[illegible]

[45] [illegible]83[illegible]84[illegible]

[46] [illegible]

[47] [illegible]17—28[illegible]

[48] [illegible]44[illegible]

[49] [illegible]·R. [illegible]3[illegible]

[50] [illegible]112[illegible]

[51] [illegible]480—481[illegible]534[illegible]

[52] [illegible]·D. [illegible]Michael D. Coe[illegible]4[illegible]1944[illegible]71[illegible]

[53] [illegible]·D. [illegible]Michael D. Coe[illegible]75—76[illegible]

[54] [illegible]540—541[illegible]

[illegible]10[illegible]
[illegible]“[illegible]”[illegible]

[illegible] “[illegible]”[1]

[illegible]4000[illegible]

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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]3500[illegible]Lapita[illegible]300[illegible]500[illegible]Aotearoa[illegible]800[illegible]1000—1200[illegible][3][illegible]·[illegible]

[illegible]30 000—40 000[illegible][4]

[illegible]—[illegible]—[illegible]13[illegible]

[illegible]—[illegible][5][illegible]

[illegible]500[illegible]50[illegible]5000[illegible]13[illegible]

[illegible]

[illegible]——[illegible][6][illegible]——[illegible]“[illegible]”（Shah of Shahs）.

[illegible]

[illegible]·[illegible]“[illegible]”[illegible][7][illegible]

[illegible]——[illegible]9[illegible]·[illegible]——[illegible]——[illegible]“[illegible]”。[8]

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[illegible]“[illegible]——[illegible]”[illegible]——[illegible]

[illegible]——[illegible]——[illegible]·[illegible]——[illegible]Janet Abu-Lughod[illegible]13[illegible]——[illegible]·[illegible]·[illegible]Andre Gunder Frank[illegible]·[illegible]Barry Gills[illegible]“[illegible]”[illegible][10][illegible]·[illegible]——[illegible]Christopher Chase-Dunn[illegible]·D. [illegible]Thomas D. Hall[illegible][11]

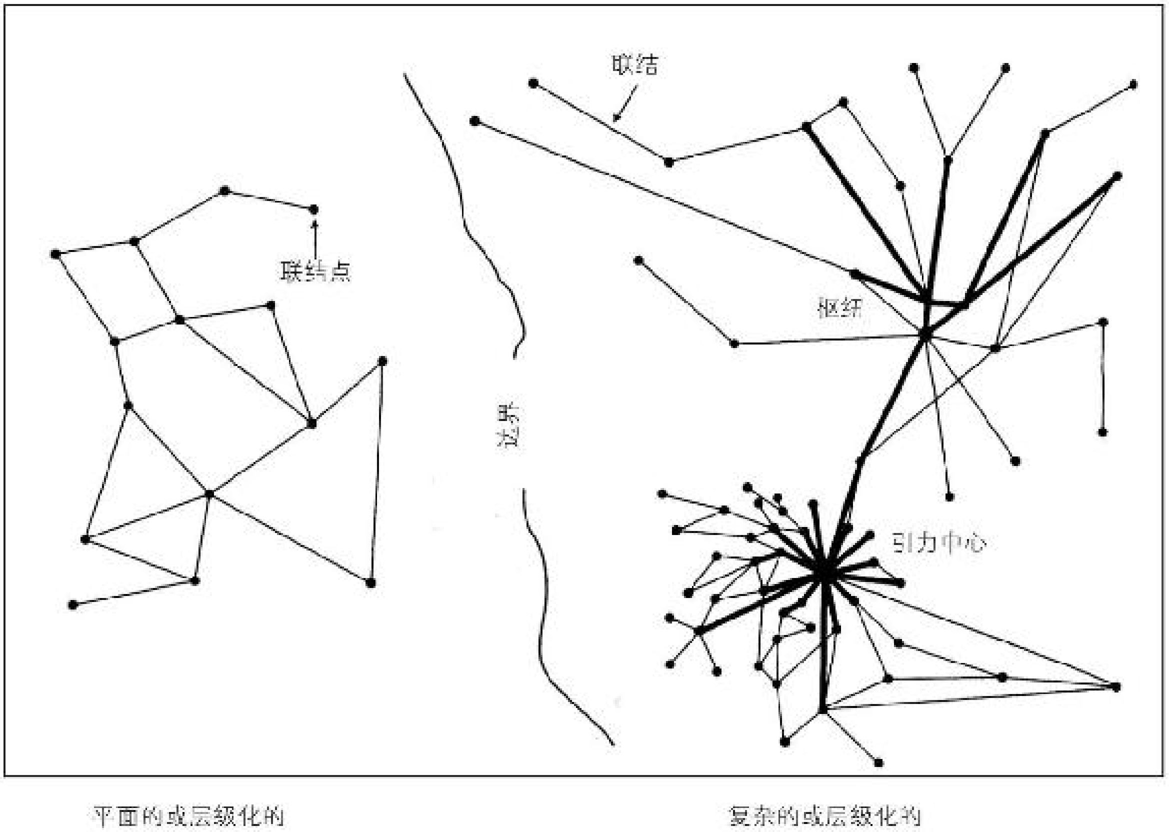
[illegible]·[illegible]“[illegible]”[illegible]

[illegible]——[illegible][12][illegible]

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[illegible]Topology[illegible]“[illegible]”[illegible]10.1[illegible]



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[illegible]19[illegible]19[illegible]13[illegible]4000[illegible]13[illegible]

[illegible]

[illegible]

[illegible]

[illegible]3000[illegible]4000[illegible]1000[illegible]1/5[illegible]—[illegible]10.1[illegible]

[illegible]4000[illegible]

[illegible]10.1 [illegible]

日期	事件
约公元前3200年	苏美尔最早的国家
约公元前3000年	埃及最早的国家
约公元前2500年	北印度／巴基斯坦最早的国家（公元前第二个千年消亡）
约公元前2200年	美索不达米亚最早的区域性国家／帝国
约公元前2000年	中国北方（黄河流域）最早的国家
约公元前1000年	北印度／恒河国家复兴
约公元前500年	东南亚最早的国家
约公元前500年	波斯的“第二帝国”
约公元前500年	美索不达米亚最早的国家
约公元前500年	美索不达米亚最早的区域国家／帝国
约公元600年	撒哈拉以南非洲最早的国家
约公元1400年	中美洲／南美洲最早的国家

[illegible]3000[illegible]2000[illegible]Yam[illegible]Kerma[illegible]2350[illegible]50[illegible][13][illegible]5400[illegible][14][illegible]ensis[illegible]

[illegible]2000[illegible]Agade[illegible]

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[illegible]……

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[illegible]——[illegible]

[illegible][15]

[illegible]2000[illegible][16][illegible]

[illegible]20[illegible][17][illegible]1792[illegible]282[illegible]49[illegible]10.2[illegible]

[illegible]—[illegible]—[illegible]—[illegible]500[illegible]—[illegible]



□10.2 □□□□□□□□□□18□□□

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[illegible]320——[illegible]185[illegible]268——[illegible]233[illegible]

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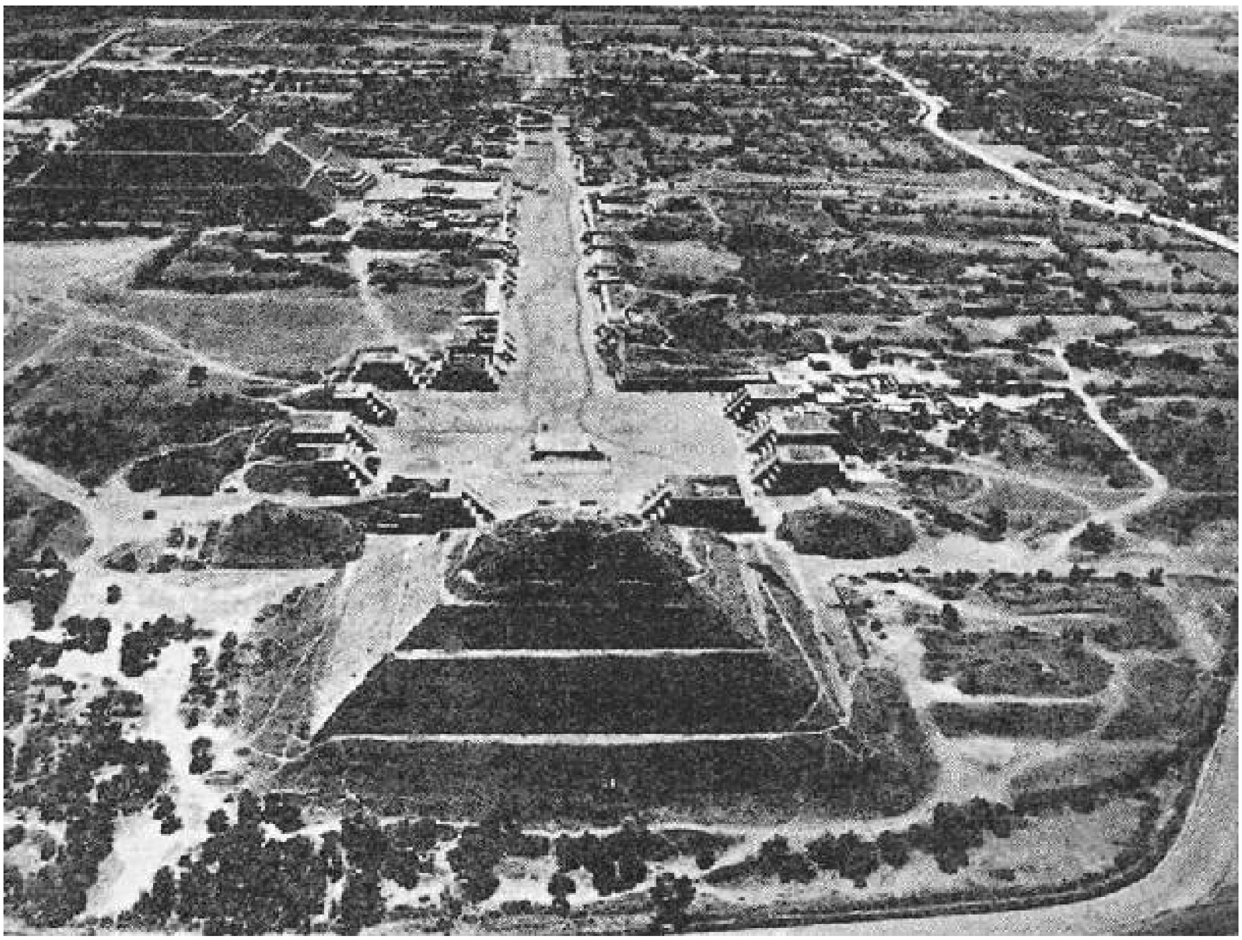
[illegible]9[illegible]Kanem[illegible]
[illegible]Sayf[illegible]100[illegible]

[illegible]——[illegible]
[illegible]1[illegible]3/4[illegible]1300[illegible]1/4[illegible]

[illegible][23][illegible]
[illegible]10[illegible]
[illegible]988[illegible]
9[illegible]

[illegible]1000[illegible]16[illegible]
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[illegible]Teotihuacán[illegible]
[illegible]50[illegible]500[illegible]150[illegible]
[illegible]6[illegible]——8[illegible]——[illegible]6000[illegible]·[illegible]

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□□René Millon□□□□□1□□□□□□□□□□□□□□□□□□□□□□1973□□□□·□□□□□□

[illegible] 15 [illegible] Tenochtitlán [illegible] 20 [illegible] —— 30 [illegible] Cortés [illegible] · [illegible] · [illegible] · [illegible] Bernal Díaz del Castillo [illegible] 1519 [illegible]

> [illegible] Iztapalapa [illegible] cues [illegible] Amadis [illegible] [27] [illegible] [28]

1500 [illegible] 200 [illegible] “ [illegible] ” [illegible] 7 [illegible] [29]

[illegible] 15 [illegible] 30 [illegible] Chaokia [illegible] 1200 [illegible] 3 [illegible] —— 4 [illegible]

[illegible] — [illegible] — [illegible] 16 [illegible]

[illegible]

[illegible]4000[illegible]·[illegible]Rein Taagepera[illegible]—[illegible]“[illegible]”[illegible]—[illegible]10.2[illegible]

[illegible]10.2 [illegible]—[illegible]

时代	日期	控制的地区以100万平方千米计	占今国家面积的百分比
后期农耕1	公元前第三个千年	0.15（均在西南亚）	0.2
	公元前第二个千年中叶至公元前第一个千年	1—2.5	0.75—2.0
后期农耕2	约公元前6世纪	8	6.0
	约公元前1世纪	16	
	公元1000年	16	
后期农耕3	约公元13世纪	33（主要为蒙古帝国）	25.0
	约公元17世纪	44（此时计入美洲）	33.0
现代	20世纪	大约130	100.0

[illegible]·[illegible]·K. [illegible]Stephen K. Sanderson[illegible]·[illegible]1995[illegible]79—82[illegible]·[illegible]7[illegible]1978[illegible]108—127[illegible]

[illegible]—[illegible]2%[illegible]1000[illegible]6%——13%[illegible]—[illegible]

[illegible]500[illegible]1000[illegible]1000[illegible]1500[illegible]20[illegible]2.2[illegible][30]

[illegible]17[illegible]300[illegible]20[illegible]1/3[illegible]

[illegible]

[illegible]

[illegible]

[illegible]—[illegible]—[illegible]

[illegible]10.3[illegible]10.4[illegible]—[illegible]4000[illegible]

[illegible]

[illegible]10.3 [illegible]

时代	近似日期	载人和货物的方式
旧石器时代	距今大约70万年前	最早的人亚科原人在非洲迁移
	距今大约10万年前	现代人出现在欧亚大陆；最早的现代人迁移出非洲
	距今大约公元前6万年前	最早渡海移居澳大拉西亚；最早的海船
农耕时代	大约公元前4000年前	畜力运输工具
	大约公元前3500年前	轮式运输工具
	大约公元前1500年前	波利尼西亚长途海运
近代	公元第一个千年	造船航海技术改进
	大约19世纪早期	火车和轮船
	大约19世纪晚期	内燃机
	大约20世纪早期	空中旅行
	大约20世纪中期	太空旅行

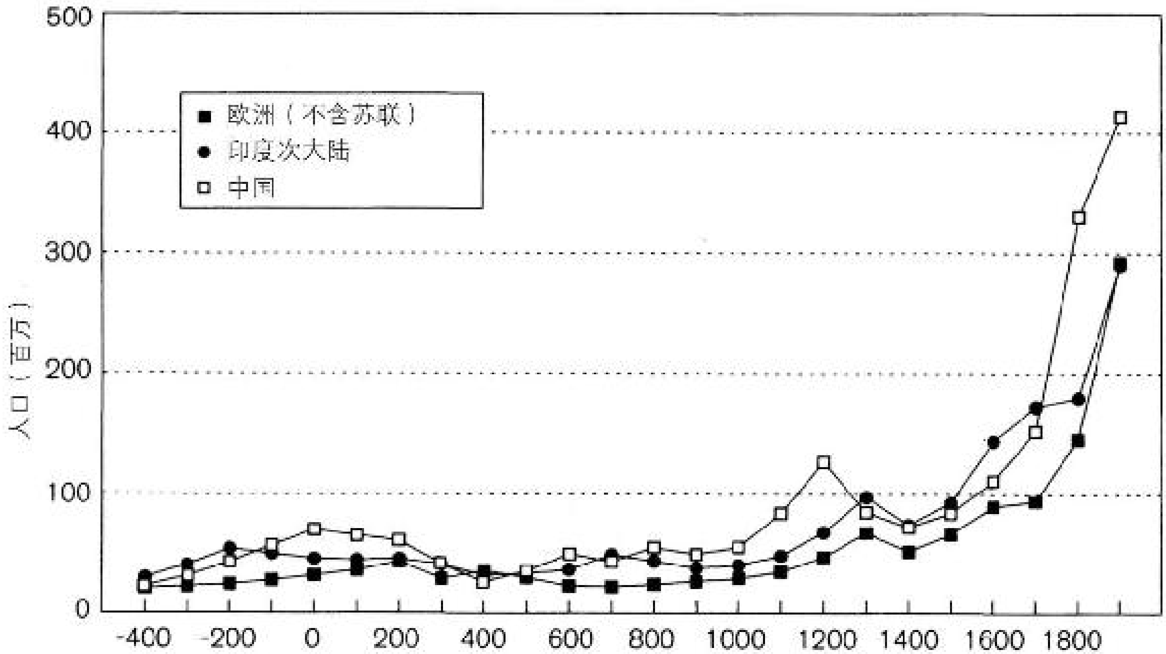
[illegible]10.4 [illegible]

时代	近似日期	信息运动方式
旧石器时代	旧石器时代，人类历史的开端	现代语言形式；不同群体之间分享信息
	旧石器时代晚期	洞穴画
	旧石器时代晚期以来？	用鼓、灯塔、烟等信号进行远距离交流
农耕时代	大约公元前3000年	作为固定信息的文字
	大约公元前2000年	字母文字
	农耕文明时代	政府资助的或军事的通信系统
	大约公元8世纪以来	木版印刷
近代	大约公元16世纪	全球世界体系；世界交通和运输体系
	大约18和19世纪	印刷用于大众交流：报纸、邮政服务
	19世纪30年代	电报
	19世纪80年代后期	电话
	20世纪	电子化大众媒体：无线电、电影、电视
	20世纪晚期	因特网、即时全球信息交流

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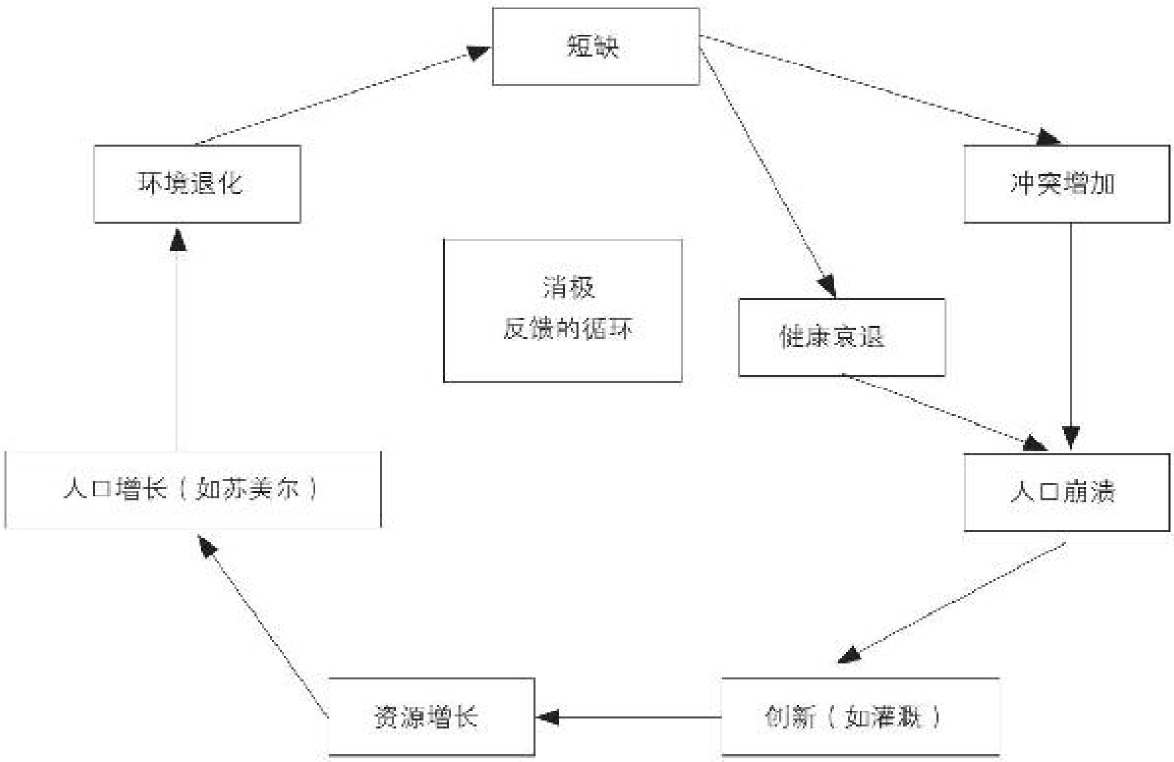
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[illegible]3000[illegible]1[illegible]5000[illegible]2.5[illegible]6.2[illegible]6.3[illegible]——[illegible]1966[illegible]·[illegible]Emmanuel Le Roy Ladurie[illegible]·[illegible]Robert Lopez[illegible]“[illegible]”[illegible]“[illegible]”[31][illegible]“[illegible]”[illegible][32][illegible][33][illegible]



[illegible]10.4 [illegible]400——[illegible]1900[illegible]
[illegible]J. R. [illegible]34[illegible]1997[illegible]16[illegible]

[illegible]·[illegible]10.4[illegible]J. R. [illegible]400——[illegible]1900[illegible][34][illegible]——[illegible]10.5[illegible]



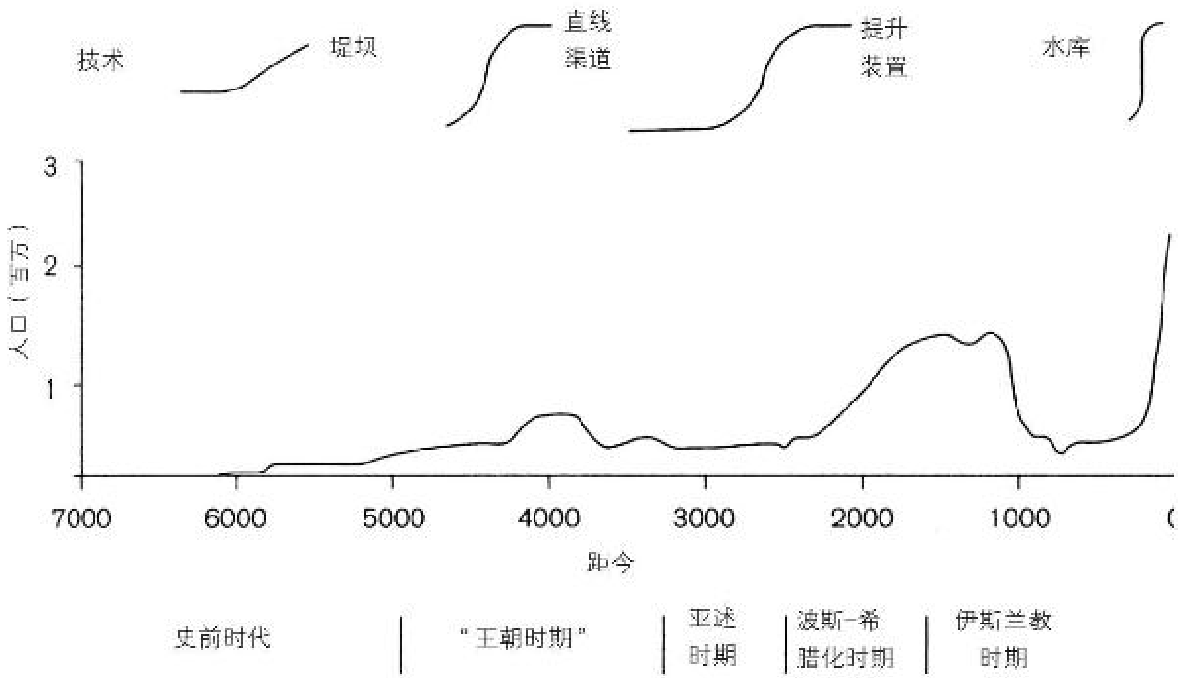
[illegible]10.5 [illegible]

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[illegible]·[illegible]“[illegible]”[illegible][37][illegible]

[illegible]——[illegible]·[illegible][38][illegible]6.3[illegible]1000——[illegible]1[illegible]3000——[illegible]1000[illegible]1630[illegible]1580[illegible]1000[illegible]——[illegible]1[illegible]945[illegible]—[illegible]

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[illegible]“[illegible]”[40]


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霍普韦尔
印第安人
大西洋
奥尔梅克
阿兹特克帝国
墨西哥城
玛雅
亚马孙
盆地
太平洋
南美洲
印加
利马
安第斯山脉

[illegible]10.1 [illegible]

[illegible]

[illegible]——[illegible]320—535[illegible]“[illegible]……[illegible]”[41][illegible]

[illegible]2[illegible]220[illegible]618[illegible][42][illegible]14[illegible]

[illegible]

[illegible]

[illegible][43][illegible]

[illegible]

[illegible]·[illegible][44][illegible]10.5[illegible]

[illegible]10.5 [illegible]

时　代	日　期	国家或者帝国	控制地域面积（100万平方千米）
农业时代晚期1	公元前第三个千年晚期	阿卡德的萨尔贡，美索不达米亚南部	0.6
	公元前第三个千年晚期	埃及	0.4
	公元前第二个千年晚期	埃及图特摩斯三世（公元前1490—1463）	1.0
	公元前第二个千年晚期	中国商朝	1.0
农业时代晚期2	公元前第一个千年中期	伊朗阿黑门尼德王朝（及其继承者）	5.5
	公元前第一个千年后期	印度孔雀王朝	3.0
	公元前第一个千年后期	中国汉朝	6.0
	公元第一个千年早期	地中海罗马帝国	4.0
	公元第一个千年中期	早期伊斯兰帝国	10.0
	公元第一千年后期	内陆欧亚大陆第一突厥帝国	7.5
农业时代晚期3	公元第二千年中—早期	内陆欧亚大陆蒙古帝国	25.0
近代	大约公元1500年	美洲印加和阿兹特克帝国	2.2

[illegible]·[illegible]7[illegible]1978[illegible]108—127[illegible]

[illegible]3000——[illegible]600[illegible]1[illegible]1[illegible]100[illegible]0.6[illegible]0.4[illegible]1[illegible]13[illegible]12[illegible]

[illegible]5.5[illegible]200[illegible]3[illegible]3[illegible]16[illegible]1[illegible]6[illegible]1[illegible]4[illegible]7[illegible]8[illegible]10[illegible]—[illegible]

[illegible]13[illegible]25[illegible]17[illegible]25[illegible]5—10[illegible]

[illegible]2000[illegible]1500[illegible]2[illegible]0.22[illegible][45]

[illegible][46][illegible]——[illegible]Naram-Sin[illegible]2250——[illegible]2220[illegible]

[illegible]—[illegible]·[illegible]1949[illegible]“[illegible]”[illegible][47][illegible]—[illegible]

[illegible]17[illegible]“[illegible]”[48][illegible]

[illegible]

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[50] · Moses Finley “ ”[51]

[illegible]“[illegible]”[illegible]

[illegible]

[illegible][52][illegible]

[illegible]……[illegible]

[illegible]

[illegible][53]

[illegible]·[illegible]Nizam al-Mulk[illegible]“[illegible]”[illegible]12[illegible]“[illegible]‘[illegible]’[illegible]‘[illegible]’[illegible]……[illegible]”[54]

[illegible]——[illegible]221——[illegible]207[illegible]——[illegible]

[illegible][55] [illegible]

[illegible]·[illegible][56] [illegible]

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650 20 100

430 50 100 70 290

520 1000

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时期	城市数量	最大城市规模	最大城市总人口
公元前 2250 年	8	约 30 000	240 000
公元前 1600 年	13	24 000—100 000	459 000
公元前 1200 年	16	24 000—50 000	499 000
公元前 650 年	20	30 000—120 000	894 000
公元前 430 年	51	30 000—200 000	2 877 000
公元 100 年	75	30 000—450 000	5 181 000
公元 500 年	47	40 000—400 000	3 892 000
公元 800 年	56	40 000—700 000	5 237 000
公元 1000 年	70	40 000—450 000	5 629 000
公元 1300 年	75	40 000—432 000	6 224 000
公元 1500	75	45 000—672 000	7 454 000

[illegible]·K. [illegible]1995[illegible]267[illegible]·[illegible]Tertius Chandler[illegible]4000[illegible]1987[illegible]460—478[illegible]

[illegible][59][illegible]·[illegible]“[illegible]”[60][illegible][61]

[illegible]

[illegible][62][illegible]Elba[illegible]Mari[illegible][63]

[illegible]1974[illegible]Kanesh[illegible]Kül Tepe[illegible][64][illegible]

[illegible]1400[illegible]814[illegible]

[illegible]—[illegible]1000[illegible][65][illegible]7[illegible]4[illegible][66][illegible]2[illegible]—[illegible]

[illegible]

[illegible]——[illegible]——[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible][67][illegible][68]

[illegible]

[illegible]·[illegible][69][illegible][70]

[illegible]

[illegible]20[illegible]

[illegible]

[illegible]

[illegible]—[illegible]4000[illegible]——[illegible]——[illegible]——[illegible]——[illegible]

[illegible]

[illegible]5000[illegible]——[illegible]——[illegible]

[illegible]——[illegible]

[illegible]

[illegible]·[illegible]·K. [illegible]·[illegible]·[illegible]·[illegible]·[illegible]——[illegible]·[illegible]3000[illegible]1500[illegible]·[illegible]Jerry Bently[illegible]·[illegible]Herbert Ziegler[illegible]2003[illegible]·[illegible]Richard Bulliet[illegible]1997[illegible]·[illegible]Howard Spodek[illegible]2[illegible]2001[illegible]·[illegible]1963[illegible]·[illegible]Göran Burenhult[illegible]3[illegible]4[illegible]1994[illegible]·[illegible]1986[illegible]·[illegible]4000[illegible]1987[illegible]·[illegible]1995[illegible]2[illegible]——[illegible]1985[illegible]·[illegible]

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[1] [illegible]·[illegible]2000[illegible]108[illegible]

[2] [illegible]·[illegible]Colin Renfrew[illegible]1989[illegible]J. P. [illegible]Mallory[illegible]1989[illegible]“[illegible]”[illegible]·[illegible]Jan Vasina[illegible]“[illegible]”[illegible]36[illegible]2[illegible]1995[illegible]137—195[illegible]·[illegible]Heike Schmidt[illegible]

[3] [illegible]·[illegible]1998[illegible]2[illegible]8[illegible]·[illegible]Ben Finney[illegible]5[illegible]2[illegible]1994[illegible]273—298[illegible]·R. [illegible]5[illegible]2[illegible]1994[illegible]·[illegible]N. S. W. [illegible]1995[illegible]164—165[illegible]

[4] [illegible]2[illegible]

[5] [illegible]·[illegible]11[illegible]1[illegible]2000[illegible]1—26[illegible]

[6] [illegible]·[illegible]“[illegible]”[illegible]2[illegible]1995[illegible]159[illegible]

[7] [illegible]·R. [illegible]3[illegible]

[8] [illegible]·[illegible]·[illegible]Het Spinius[illegible]1998[illegible]7—8[illegible]29—53[illegible]

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[12] “[illegible]”[illegible]——[illegible]53[illegible]

[13] [illegible]·[illegible]·[illegible]1988[illegible]167—168[illegible]

[14] [illegible]·L. [illegible]Charles L. Redman[illegible]·[illegible]3[illegible]1994[illegible]32[illegible]

[15] [illegible]S. N. [illegible]Kramer[illegible]·B. [illegible]Pritchard[illegible]3[illegible]1969[illegible]647—648[illegible]A. [illegible]·[illegible]87[illegible]

[16] [illegible]·K. [illegible]·[illegible]·[illegible]1700[illegible]——[illegible]170[illegible]143—199[illegible]153—155[illegible]

[17] [illegible]·[illegible]·[illegible]Christopher Braider[illegible]1988[illegible]27[illegible]

[18] [illegible]

[19] [illegible]·K. [illegible]·[illegible]·[illegible]81—114[illegible]86[illegible]

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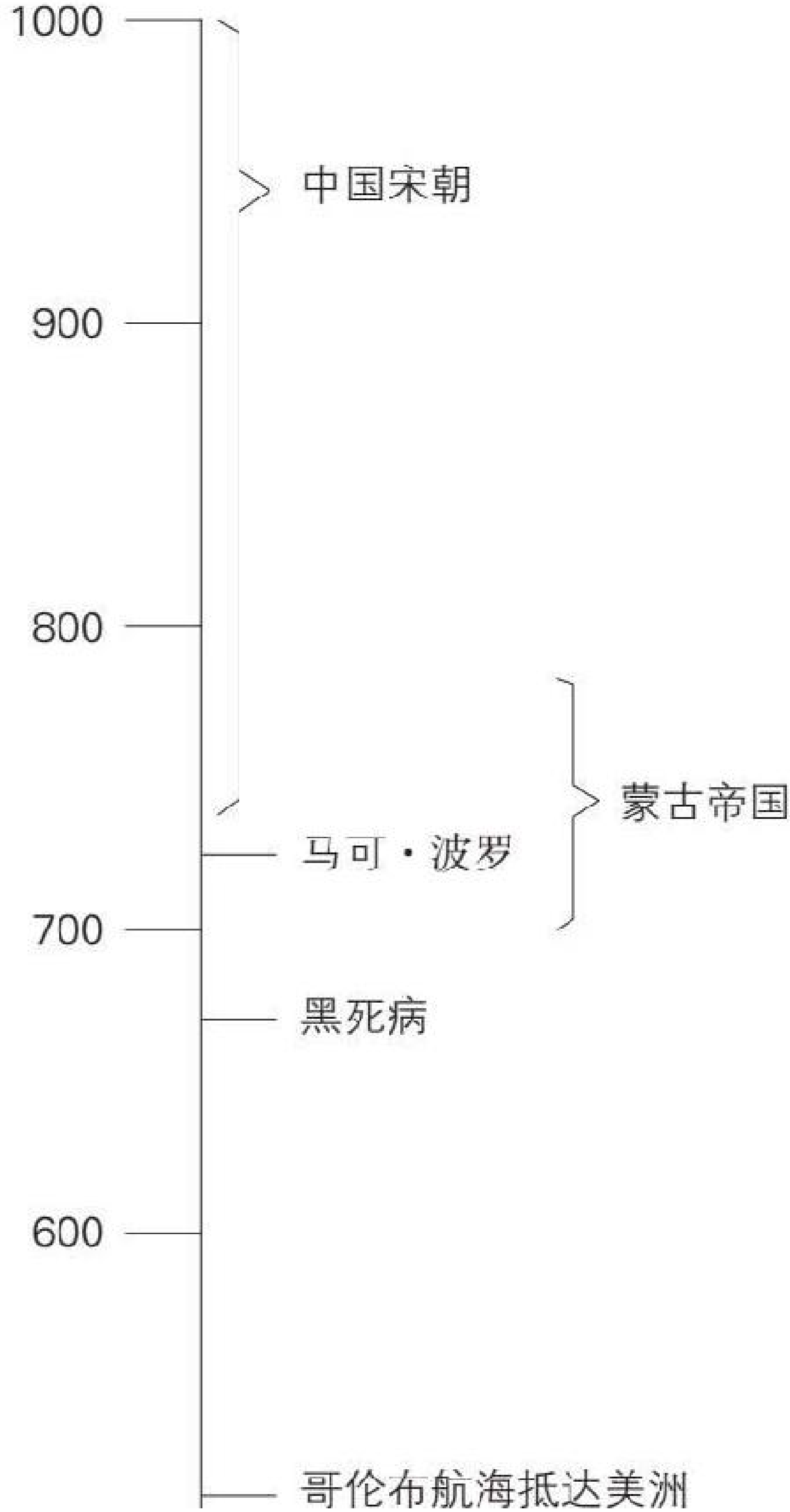
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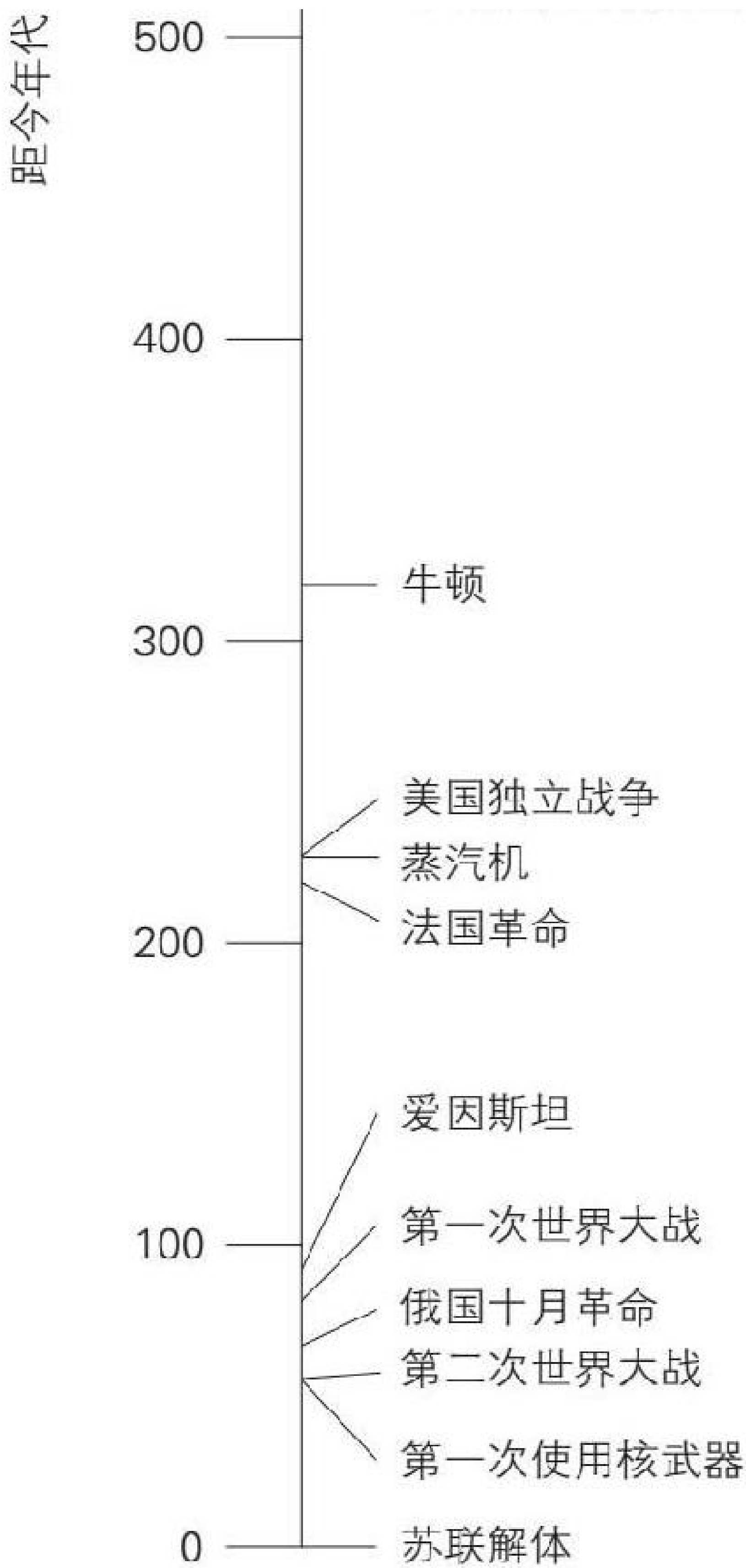
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中国宋朝
900
800
蒙古帝国
马可·波罗
700
黑死病
600
哥伦布航海抵达美洲



距今年代
500
400
牛顿
300
美国独立战争
蒸汽机
法国革命
200
爱因斯坦
第一次世界大战
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俄国十月革命
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人口问题

人口的剧增是当今世界最引人注目的问题之一——人口与生活质量的问题。2000年世界人口已增长到20世纪初的近四倍。自人类诞生以来，世界人口是在不断增长的。但在人类发展的大部分历史时期内，人口增长是十分缓慢的，只是进入近代以来，人口增长才开始加速。

人口增长

据有关资料统计，如图11.1所示。世界人口1960年达到了三十亿，而到2000年全球人口已逾六十亿，而且还在迅速增长中。到2026年11月1日将是世界末日[14]，即所谓“末日预言”。在人类历史中，大部分时期人口增长都很缓慢。公元元年至1000年间，世界人口约为2.5亿，20世纪初也只增加到24亿，而到60年代初，世界人口增加速度不断地变化。公元1500年，世界人口总计约4.6亿，1800年为9.5亿，接近10亿，到1900年达到了约16亿，1800年以前约800年间，世界人口才增加了4亿，而1800年后的约200年间，则增加了约6亿。按照联合国人口基金会的统计，目前世界人口已超过6.3亿人。从图11.1可以清楚地看到近几百年来世界人口急剧增长的情况。

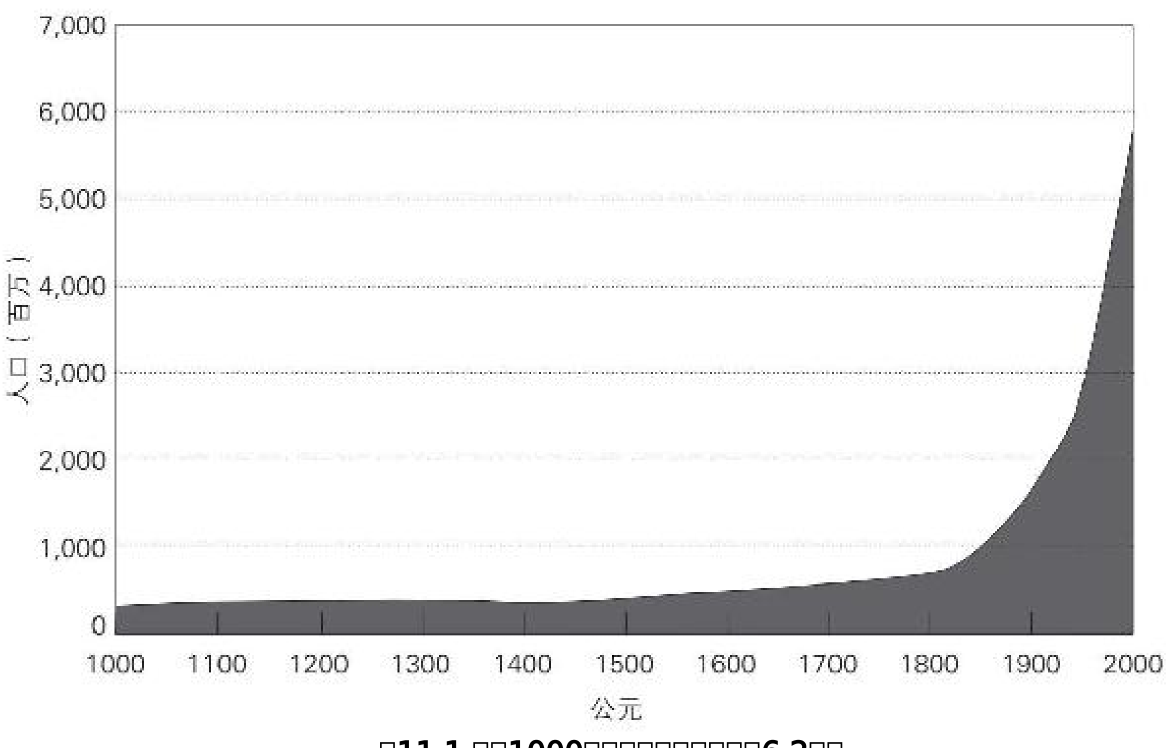


图11.1 公元1000年以来世界人口增长至6.2亿人

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□11.1 □□□□□□□□□□□400—□□2000□□

年份	地区（百万）												总计
	中国	印度次大陆	西南亚	日本	亚洲其他地区	欧洲	苏联	北非	撒哈拉以南非洲	北美	中南美洲	大洋洲	
公元前400年	19	30	42	1	3	19	13	10	7	1	7	1	153
公元前300年	30	42	47	1	3	22	13	12	8	1	7	1	187
公元前200年	40	55	52	1	4	25	14	14	9	2	8	1	225
公元前100年	55	50	50	1	4	28	13	14	10	2	9	1	237
公元元年	70	46	47	2	5	31	12	14	12	2	10	1	252
公元100年	65	45	46	2	5	37	12	15	13	2	9	1	252
公元200年	60	45	46	2	5	44	13	16	14	2	9	1	257
公元300年	42	40	45	3	6	30	13	14	16	2	10	1	222
公元400年	25	32	45	4	7	36	12	13	18	2	11	1	206
公元500年	32	33	41	5	8	30	11	11	20	2	13	1	207
公元600年	49	37	32	5	11	22	11	7	17	2	14	1	208
公元700年	44	50	25	4	12	22	10	6	15	2	15	1	206
公元800年	56	43	29	4	14	25	10	9	16	2	15	1	224
公元900年	48	38	33	4	16	28	11	8	20	2	13	1	222
公元1000年	56	40	33	4	19	30	13	9	30	2	16	1	253
公元1100年	83	48	28	5	24	35	15	8	30	2	19	2	299
公元1200年	124	69	27	7	31	49	17	8	40	3	23	2	400
公元1300年	83	100	21	10	29	70	16	8	60	3	29	2	431
公元1400年	70	74	19	9	29	52	13	8	60	3	36	2	375
公元1500年	84	95	23	10	33	67	17	9	78	3	39	3	461
公元1600年	110	145	30	11	42	89	22	9	104	3	10	3	578
公元1700年	150	175	30	25	53	95	30	10	97	2	10	3	680
公元1800年	330	180	28	25	68	146	49	10	92	5	19	2	954
公元1900年	415	290	38	45	115	295	127	43	95	90	75	6	1634
公元2000年	1262	1327	181	127	680	514	290	151	659	313	516	30	6057

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[illegible]800[illegible]1/10[illegible]300[illegible]1/2[illegible]·[illegible]Charles Tilly[illegible]“[illegible]”[24][illegible]19[illegible]·[illegible]“[illegible]”[illegible]

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[illegible][27][illegible]60[illegible]

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Abraham Darby 18

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T. S. Ashton

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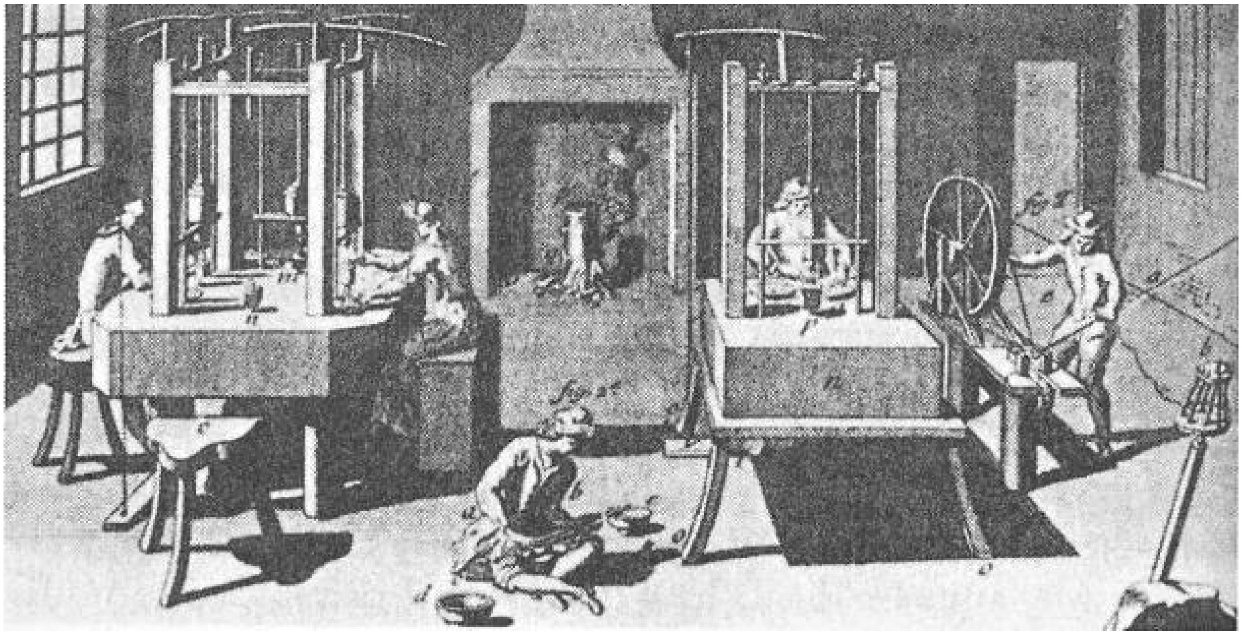
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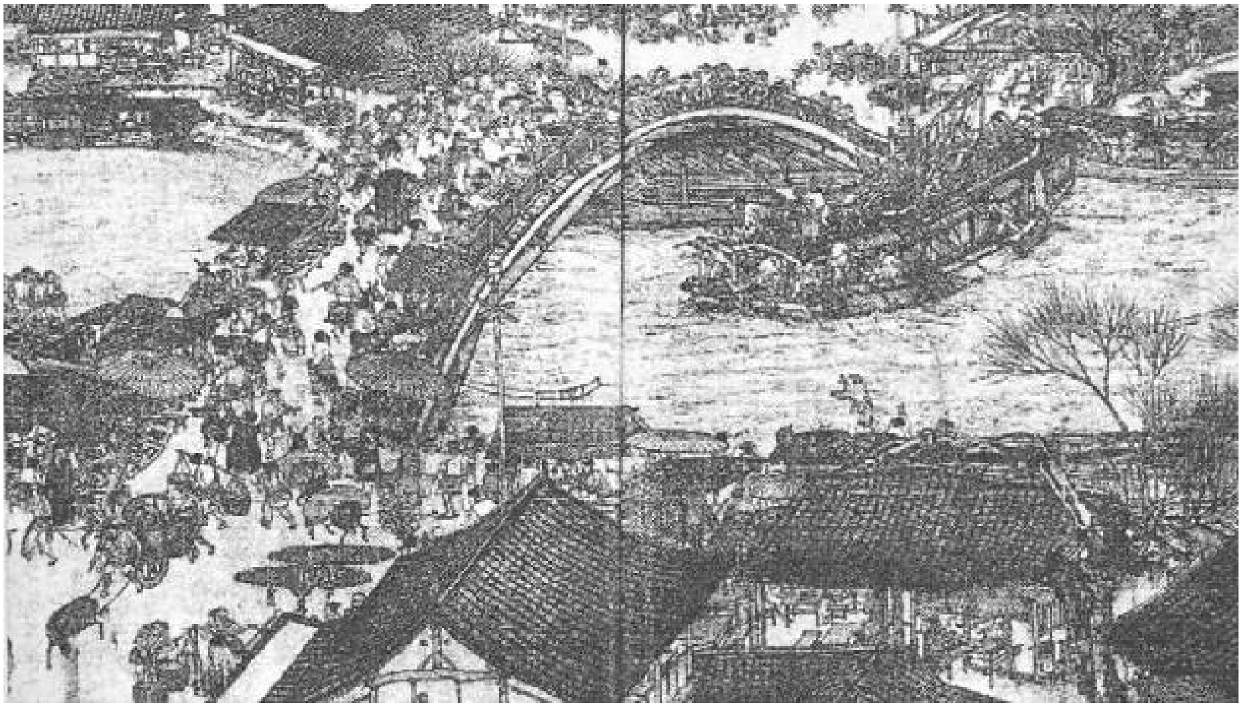
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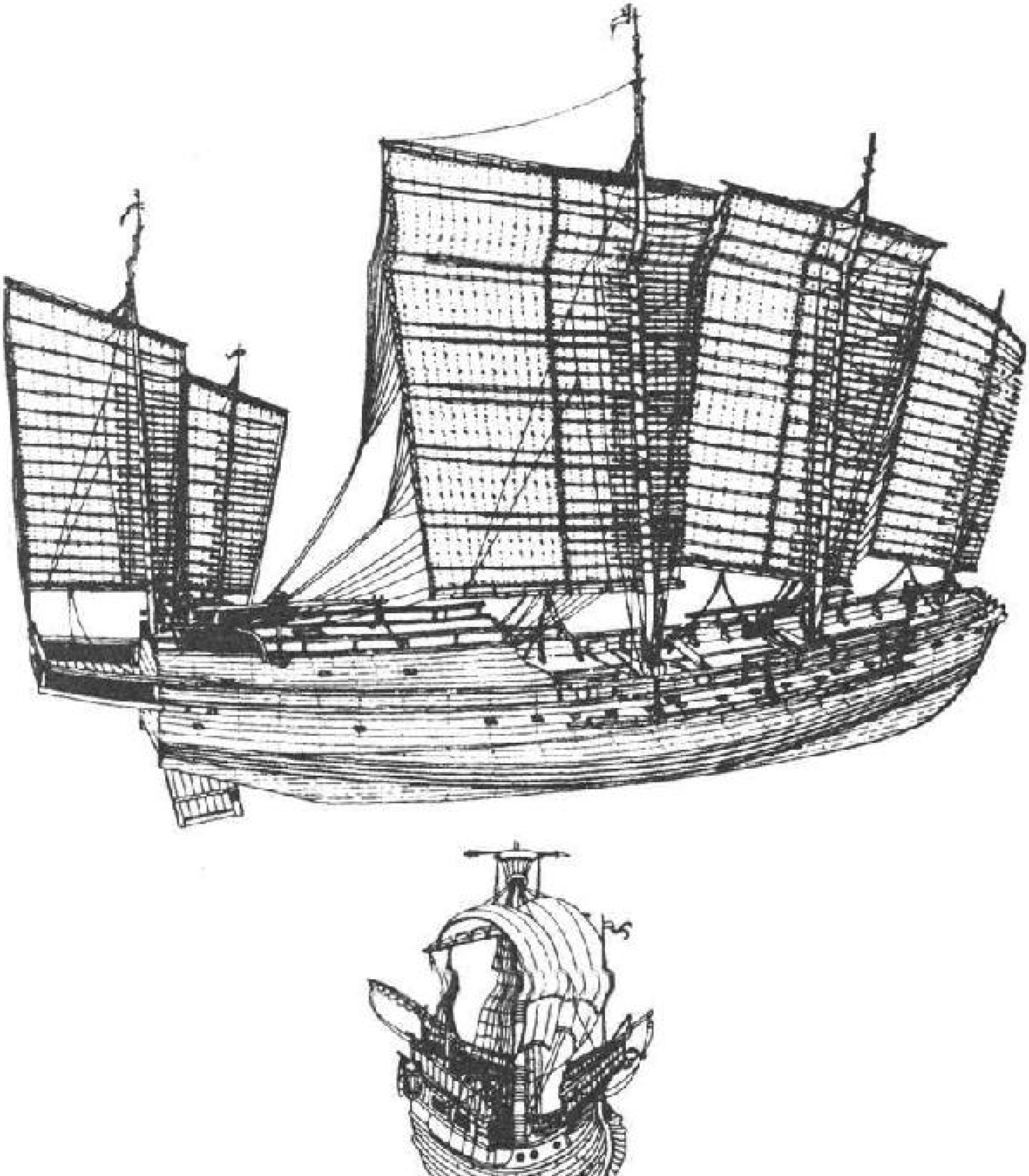
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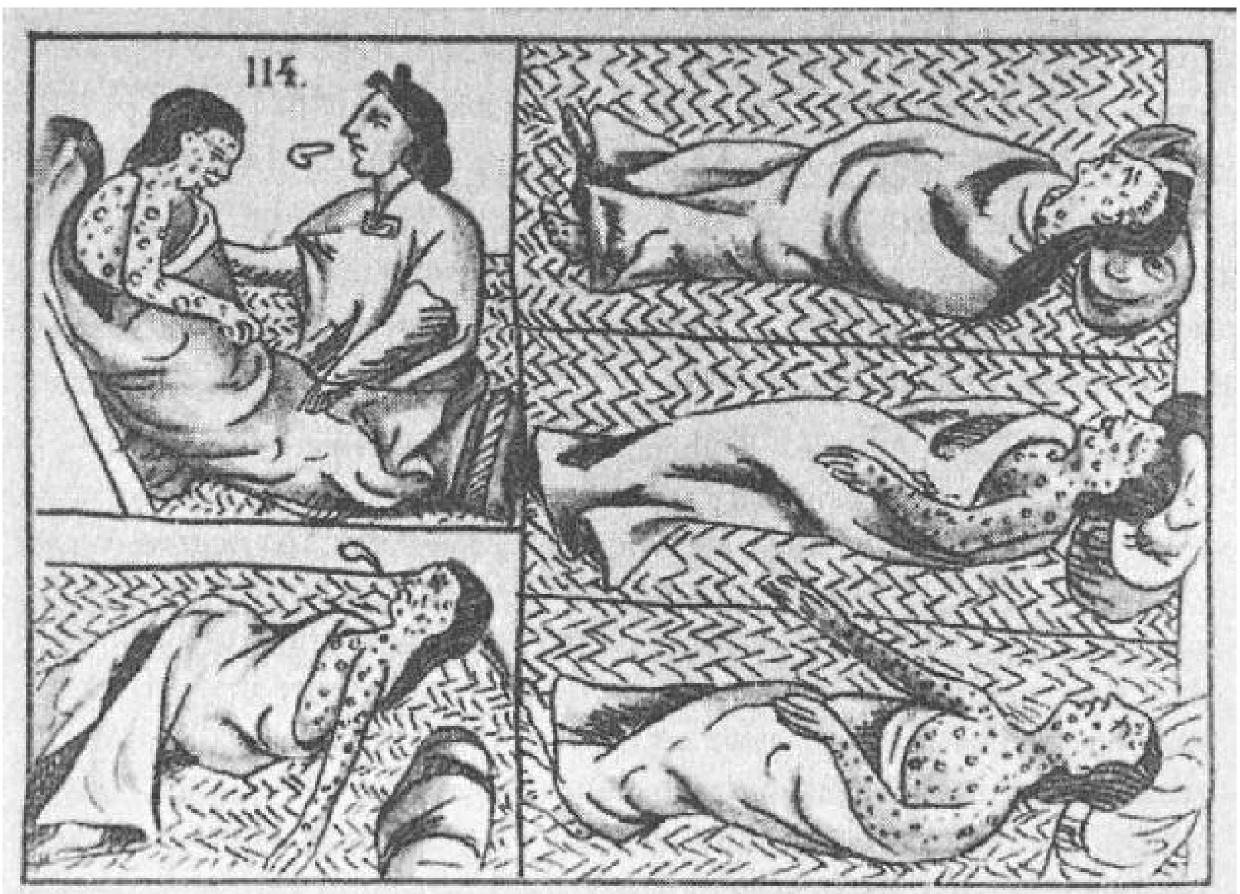


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[illegible]—[illegible]1400—1700[illegible]7000[illegible]1.5[illegible]7400[illegible]1.75[illegible]5200[illegible]9500[illegible]11.1[illegible]18[illegible]66%[illegible]80%[illegible][58][illegible]·[illegible]·[illegible]1750[illegible]1800[illegible]“[illegible]”[illegible][59]

[illegible]18[illegible]·[illegible]·[illegible]17[illegible]

[illegible]“[illegible]”[illegible]17[illegible]——[illegible]16[illegible]17[illegible][60]

[illegible]16[illegible]18[illegible][61]

[illegible]——[illegible]——[illegible]17[illegible]—[illegible]19[illegible]1800[illegible]·[illegible][62][illegible][63]

[illegible]19[illegible]

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[illegible]17[illegible]1724[illegible]11%[illegible]19[illegible]30%——40%[illegible][65][illegible]19[illegible]50[illegible]19[illegible]

[illegible]—[illegible]1000[illegible]……[illegible][66]

[illegible]—[illegible]18[illegible]“[illegible]”[67][illegible]

[illegible]20[illegible]1906[illegible]

> [illegible]……[illegible]……[illegible]——[illegible][68]

[illegible]18[illegible]

[illegible]

[illegible]

[illegible]—[illegible]

[illegible]

[illegible]—[illegible]—[illegible]—[illegible]—[illegible]1800[illegible]

[illegible]-[illegible]16[illegible]16—19[illegible][69][illegible]·[illegible]

[illegible][70]

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[illegible]—[illegible]

[illegible]16[illegible]1500[illegible]3000[illegible]2000[illegible]·[illegible]990—1992[illegible]1992[illegible]

[illegible]10[illegible][72][illegible]18[illegible]

[illegible]15[illegible]17[illegible][73][illegible][74][illegible]——[illegible]——[illegible]16[illegible]

[illegible]

[illegible]

[illegible]—[illegible]

[illegible]

[illegible]·[illegible]16[illegible]17[illegible]“[illegible]”“[illegible]”[illegible][75][illegible]·[illegible]“‘[illegible]’……[illegible]……[illegible]500[illegible]”[76][illegible]16[illegible]17[illegible]“[illegible]”[illegible]·[illegible]Steven Shapin[illegible]“[illegible]”[illegible][77][illegible]

[illegible]16[illegible]17[illegible]·[illegible]·[illegible][78][illegible]13[illegible]

[illegible]17[illegible]——[illegible]

[illegible]——[illegible]15[illegible]1714[illegible]1762[illegible]·[illegible][79]

[illegible]16[illegible]·[illegible]·[illegible]·[illegible]Charles Loyseau[illegible]“[illegible]”[80][illegible]“[illegible]”[illegible]19[illegible]·[illegible]·[illegible]

[illegible][81]

[illegible]·[illegible][82][illegible]“[illegible]”[illegible]

[illegible][83][illegible]17[illegible]19[illegible][84]

[illegible]15[illegible]“[illegible]”[85][illegible]15[illegible]18[illegible]1502[illegible]·[illegible]·[illegible]Robert de Balsac[illegible]“[illegible]”[86][illegible]100[illegible]

[illegible][87][illegible]—[illegible]1221[illegible][88][illegible]15[illegible]16[illegible]——[illegible]——[illegible]16[illegible]19[illegible][89]

[illegible]

[illegible]13[illegible]·[illegible]Catharina Lis[illegible]·[illegible]Hugo Soly[illegible]

> [illegible]300[illegible]……13%[illegible]33%[illegible]……36%[illegible]……16%[illegible]……3%[illegible][90]

[illegible]·[illegible]Maxine Berg[illegible]17[illegible]Staffordshire[illegible]

> [illegible]Needlewood Forest[illegible]·[illegible]Cannock Chase[illegible]Kinvel Forest[illegible]Worcestershire[illegible]Stourbridge[illegible]Bursham[illegible][91]

[illegible]1629[illegible]Essex[illegible]40 000—50 000[illegible]“[illegible]”[illegible]

[illegible][92][illegible]

[illegible]17[illegible]

> [illegible]Beauvasis[illegible][93]

[illegible]16[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible][94][illegible]

[illegible][95][illegible]“[illegible]”[illegible]·[illegible]·[illegible]Jan De Vries[illegible]18[illegible]19[illegible]“[illegible]Industrial[illegible]”[illegible]“[illegible]industrious[illegible]”[illegible][96]

[illegible]—[illegible]17[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]

[illegible]—[illegible]—[illegible]1700[illegible]18[illegible]

[illegible]“[illegible]”[97]

[illegible]——[illegible]1700[illegible]18[illegible]17[illegible]70—75%[illegible]40%[illegible][98][illegible]3/4[illegible][99][illegible]4000[illegible]1759[illegible]50%[illegible][100][illegible]·[illegible]Peter Mathias[illegible]“[illegible]”[101][illegible]85%[illegible]13%[illegible]1%[illegible][102]

18[illegible]1700[illegible]

[illegible]

[illegible]——[illegible]14[illegible]14—17[illegible]——[illegible]16[illegible]16[illegible]

[illegible]

[illegible]18[illegible]——[illegible]

[illegible]·[illegible]“[illegible]”[103]——[illegible]1700[illegible]

[illegible]18[illegible]——[illegible]——[illegible]

[illegible]

[illegible]1000[illegible]1973[illegible]·[illegible]950—1350[illegible]1971[illegible]·[illegible]2[illegible]1981[illegible]·[illegible]2[illegible]1987[illegible]1988[illegible]

[illegible]·[illegible]——[illegible]1989[illegible]·[illegible]·[illegible]1998[illegible]2000[illegible]1997[illegible]·[illegible]—[illegible]1972[illegible]1986[illegible]·[illegible]1982[illegible]·[illegible]2[illegible]1996[illegible]·[illegible]990—1992[illegible]1992[illegible]

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[1] [illegible]·[illegible]334[illegible]

[2] [illegible]—[illegible]·W. [illegible]900—1900[illegible]1986[illegible]

[3] [illegible]200[illegible]

[4] [illegible]·[illegible]·[illegible]

[5] [illegible]·[illegible]13[illegible]

[6] [illegible]·[illegible]·[illegible]Edmund Burke Ⅲ[illegible]1993[illegible]47[illegible]

[7] [illegible]·[illegible]Valerie Hansen[illegible]1600[illegible]W. W. [illegible]2000[illegible]263[illegible]

[8] [illegible]·[illegible]2[illegible]1987[illegible]263[illegible]

[9] [illegible]·[illegible]·[illegible]1988[illegible]159[illegible]

[10] [illegible]W. [illegible]Barthold[illegible]4[illegible]T. [illegible]Minorsky[illegible]C. E. [illegible]Boshworth[illegible]E. J. W. [illegible]1977[illegible]103—104[illegible]

[11] [illegible]Mark Elvin[illegible]1973[illegible]177[illegible]

[12] [illegible]·[illegible]—[illegible]1250—1350[illegible]1989[illegible]337—339[illegible]

[13] [illegible]—[illegible]331[illegible]1250—1276[illegible]H. M. [illegible]1962[illegible]87[illegible]

[14] [illegible]177[illegible]

[15] [illegible]169[illegible]1232—1298[illegible]

[16] [illegible]·[illegible]1000—1700[illegible]2[illegible]1981[illegible]143[illegible]·S. [illegible]950—1350[illegible]·[illegible]——[illegible]1971[illegible]

[17] [illegible]—[illegible]

[18] [illegible]·T. [illegible]2001[illegible]12[illegible]14[illegible]

[19] [illegible]·[illegible]·E. [illegible]Ross E. Dunn[illegible]·[illegible]14[illegible]1985[illegible]

[20] [illegible]·[illegible]Philip Curtin[illegible]1985[illegible]

[21] [illegible]·M. [illegible]700—1100[illegible]1983[illegible]

[22] [illegible]

[23] [illegible]·[illegible]·[illegible]2001[illegible]308—324[illegible]5[illegible]1[illegible]1994[illegible]1—21[illegible]

[24] [illegible]312[illegible]·E. [illegible]James E. McClellan III[illegible]·[illegible]Harold Dorn[illegible]·[illegible]1999[illegible]145—154[illegible]

[25] [illegible]316[illegible]

[26] [illegible]·[illegible]1400—1700[illegible]1350—1750[illegible]·[illegible]James Tracy[illegible]1991[illegible]150[illegible]

[27] [illegible]148[illegible]

[28] [illegible]35[illegible]

[29] [illegible]164[illegible]

[30] [illegible]2[illegible]64[illegible]

[31] S. A. M. [illegible]Adshead[illegible]2[illegible]1995[illegible]17[illegible]

[32] [illegible]·R. [illegible]Archibald R. Lewis[illegible]1000—1360[illegible]1991[illegible]109[illegible]130[illegible]161[illegible]95[illegible]

[33] [illegible]·[illegible]Arnold Pacey[illegible]1990[illegible]65—66[illegible]

[34] [illegible]266[illegible]

[35] [illegible]118[illegible]——[illegible]10[illegible]

[36] [illegible]264[illegible]

[37] [illegible]·R. [illegible]W. W. [illegible]2000[illegible]56[illegible]

[38] [illegible]24—26[illegible]

[39] [illegible]266—267[illegible]270—271[illegible]

[40] [illegible]7[illegible]1954—2003[illegible]

[41] [illegible]31[illegible]

[42] [illegible]1405—1433[illegible]

[43] [illegible]·[illegible]1[illegible]·[illegible]Ben Fowks[illegible]1976[illegible]247[illegible]·[illegible]“[illegible]——[illegible]”[illegible]·[illegible]Tom Bottomore[illegible]2[illegible]1991[illegible]590—591[illegible]

[44] [illegible]·O.[illegible]Dennis O. Flynn[illegible]·[illegible]Artunro Giráldez[illegible]1571[illegible]18[illegible]13[illegible]2[illegible]2002[illegible]393[illegible]

[45] [illegible]·O.[illegible]·[illegible]“[illegible]”[illegible]1571[illegible]6[illegible]2[illegible]1995[illegible]201—221[illegible]

[46] [illegible]·[illegible]——[illegible]1992[illegible]55—56[illegible]·[illegible]Carl Ipsen[illegible]

[47] [illegible]·[illegible]2001[illegible]235[illegible]16[illegible]15%——90%[illegible]11.1 [illegible]J.R.[illegible]4[illegible]1979[illegible]16[illegible]1500—1600[illegible]75%[illegible]3900[illegible]1000[illegible]·[illegible]50%[illegible]1750[illegible]860[illegible]·[illegible]Woodrow Borah[illegible]·F.[illegible]Sherburne F. Cook[illegible]1963[illegible]1500[illegible]90%[illegible]233-236[illegible]·[illegible]——[illegible]50—56[illegible]·[illegible]Bruce Castleman[illegible]

[48] [illegible]·[illegible]1492[illegible]1972[illegible]36[illegible]

[49] [illegible]·[illegible]40—41[illegible]·B.[illegible]David B. Quinn[illegible]1584—1590 [illegible]1955[illegible]1[illegible]387[illegible]

[50] [illegible]“[illegible]”[illegible]

[51] [illegible]170[illegible]

[52] [illegible]199[illegible]

[53] [illegible]60[illegible]

[54] [illegible]·[illegible]1990[illegible]70[illegible]

[55] [illegible]185[illegible]199—201[illegible]

[56] [illegible]4[illegible]

[57] [illegible]·N. [illegible]1993[illegible]18[illegible]

[58] [illegible]168[illegible]172[illegible]

[59] [illegible]66[illegible]

[60] [illegible]149[illegible]

[61] [illegible]1[illegible]2[illegible]3[illegible]

[62] [illegible]17[illegible]

[63] [illegible]

[64] [illegible]·[illegible]1982[illegible]

[65] [illegible]·[illegible]1990[illegible]33[illegible]384—388[illegible]

[66] [illegible]167[illegible]

[67] [illegible]45[illegible]

[68] [illegible]·[illegible]John Bushnell[illegible]1905—1906[illegible]1985[illegible]180[illegible]

[69] [illegible]

[70] [illegible]·[illegible]3[illegible]1[illegible]1995[illegible]13[illegible]

[71] [illegible]129[illegible]

[72] [illegible]·[illegible]——[illegible]·D.[illegible]“[illegible]”[illegible]——[illegible]1997[illegible]5[illegible]

[73] [illegible]129[illegible]

[74] [illegible]31—56[illegible]

[75] [illegible]·[illegible]1988[illegible]79—80[illegible]

[76] [illegible]25[illegible]

[77] [illegible]·[illegible]1996[illegible]79—80[illegible]

[78] [illegible]256[illegible]“[illegible]‘[illegible]’[illegible]”

[79] [illegible]·[illegible]Dava Sobel[illegible]1995[illegible]78—79[illegible]

[80] [illegible]·[illegible]1613[illegible]·[illegible]Henry Kamen[illegible]1500—1700[illegible]1984[illegible]99[illegible]

[81] [illegible]·[illegible]990—1992[illegible]1992[illegible]30[illegible]

[82] [illegible]·[illegible]990—1992[illegible]1992[illegible]14[illegible]3[illegible]

[83] [illegible]990—1992[illegible]128[illegible]

[84] [illegible]·[illegible]17[illegible]“[illegible]”[illegible]2000[illegible]

[85] [illegible]990—1992[illegible]29[illegible]

[86] [illegible]·[illegible]·[illegible]990—1992[illegible]84[illegible]

[87] [illegible]·[illegible]Geoffery Parker[illegible]1500—1800[illegible]2[illegible]1996[illegible]·[illegible]1000[illegible]1982[illegible]

[88] [illegible]47[illegible]

[89] [illegible]5[illegible]383[illegible]385[illegible]18[illegible]50%—60%[illegible]19[illegible]70%[illegible]

[90] [illegible]·[illegible]·[illegible]·[illegible]1979[illegible]15[illegible]

[91] [illegible]·[illegible]1700—1820[illegible]2[illegible]1994[illegible]98—99[illegible]

[92] [illegible]1700—1820[illegible]99[illegible]·[illegible]Keith Wrightson[illegible]1580—1680[illegible]1982[illegible]139[illegible]

[93] [illegible]·[illegible]George Huppert[illegible]1986[illegible]72[illegible]

[94] [illegible]·[illegible]54[illegible]2[illegible]1990[illegible]72[illegible]

[95] [illegible]“[illegible]”[illegible]23[illegible]1972[illegible]708[illegible]25[illegible]“[illegible]”[illegible]——[illegible]

[96] [illegible]“[illegible]”[illegible]·[illegible]·[illegible]54[illegible]2[illegible]1994[illegible]6[illegible]249—270[illegible]

[97] [illegible]·[illegible]·[illegible]1973[illegible]463[illegible]46[illegible]1979[illegible]461[illegible]——[illegible]

[98] [illegible]1688[illegible]N. E. R. [illegible]1985[illegible]13—14[illegible]100[illegible]

[99] [illegible]·[illegible]1700—1914[illegible]2[illegible]1983[illegible]26[illegible]

[100] [illegible]13—14[illegible]

[101] [illegible]29[illegible]

[102] [illegible]59[illegible]

[103] [illegible]990—1992[illegible]17[illegible]

[illegible]13[illegible]
[illegible]

[illegible]250[illegible]13.1[illegible]13.2[illegible]13.1[illegible]100[illegible]“[illegible]”[illegible]

[illegible]19[illegible]

[illegible]1750[illegible]11%[illegible]1880[illegible]40%[illegible]

[illegible]13.1 [illegible]1750—1980[illegible]

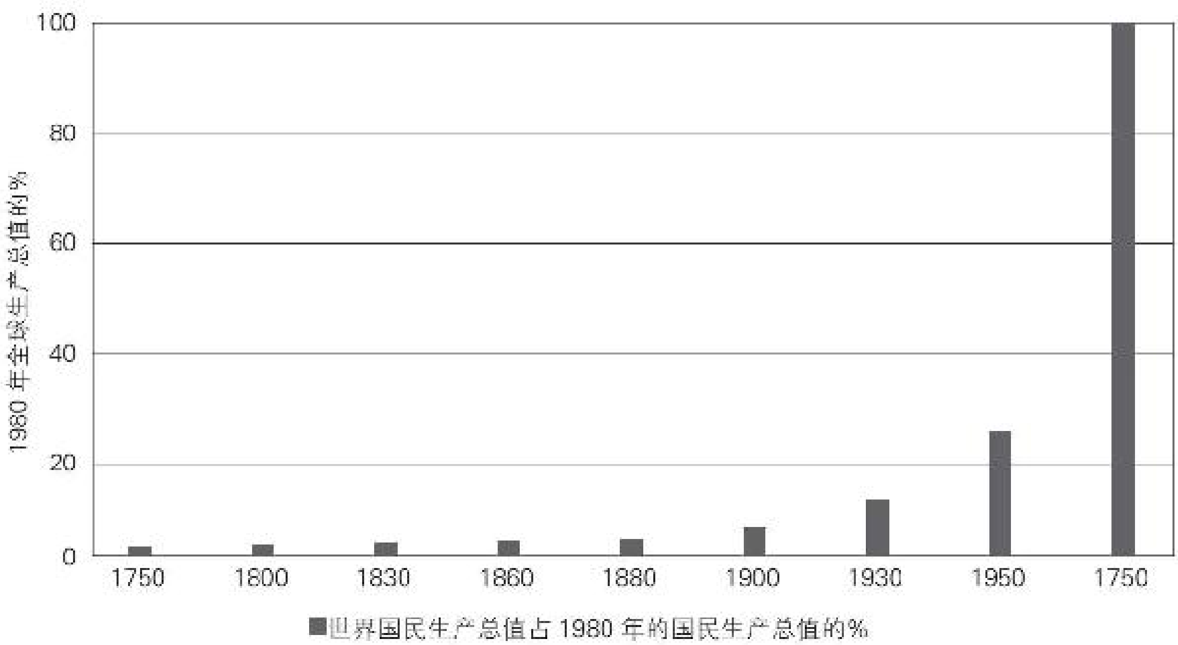
	1750	1800	1830	1860	1880	1900	1913	1928	1938	1953	1963	1973	1980
发达国家	34	47	73	143	253	481	863	1259	1562	2870	4699	8432	9718
英国	2	6	18	45	73	100	127	135	181	258	330	462	441
德国	4	5	7	11	27	71	138	158	214	180	330	550	590
法国	5	6	10	18	25	37	57	82	74	98	194	328	362
意大利	3	4	4	6	8	14	23	37	46	71	150	258	319
俄罗斯／苏联	6	8	10	16	25	48	77	72	152	328	760	1345	1630
美国		1	5	16	47	128	298	533	528	1373	1804	3089	3475
日本	5	5	5	6	8	13	25	45	88	88	264	819	1001
第三世界	93	99	112	83	67	60	70	98	122	200	439	927	1323
中国	42	49	55	44	40	34	33	46	52	71	178	369	553
印度／巴基斯坦	31	29	33	19	9	9	13	26	40	52	91	194	254
世界	127	146	185	226	320	541	933	1357	1684	3070	5138	9359	11041

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□□□B.L. □□□□□Turner II□□□□□□□□□□□□□1990□□□□58□□□□□□·□□□□□1705—1980□□□□□
□□□□□□□□□□□□□□□□□11□□1982□□□□292□299□
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1913□□1928□□1938□□□□□□□□□□□□□“□
□”□□□□□□□□“□□□□”□“□□□□□”□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□13.2 □□□□□□1750—1980□□□□□□□□□□□

	1750	1800	1830	1860	1880	1900	1913	1928	1938	1953	1963	1973	1980
发达国家	26.8	32.0	39.7	63.3	79.1	88.9	92.5	92.8	92.8	93.5	91.5	90.1	88.0
英国	1.6	4.1	9.8	19.9	22.8	18.5	13.6	10.0	10.7	8.4	6.4	4.9	4.0
德国	3.2	3.4	3.8	4.9	8.4	13.1	14.8	11.7	12.7	5.9	6.4	5.9	5.3
法国	3.9	4.1	5.4	8.0	7.8	6.8	6.1	6.0	4.4	3.2	3.8	3.5	3.3
意大利	2.4	2.7	2.2	2.7	2.5	2.6	2.5	2.7	2.7	2.3	2.9	2.8	2.9
俄罗斯／苏联	4.7	5.4	5.4	7.1	7.8	8.9	8.3	5.3	9.0	10.7	14.8	14.4	14.8
美国		0.7	2.7	7.1	14.7	23.7	31.9	39.3	31.4	44.7	35.1	33.0	31.5
日本	3.9	3.4	2.7	2.7	2.5	2.4	2.7	3.3	5.2	2.9	5.1	8.8	9.1
第三世界	73.2	67.3	60.9	36.7	20.9	11.1	7.5	7.2	7.2	6.5	8.5	9.9	12.0
中国	33.1	33.3	29.9	19.5	12.5	6.3	3.5	3.4	3.1	2.3	3.5	3.9	5.0
印度／巴基斯坦	24.4	19.7	17.9	8.4	2.8	1.7	1.4	1.9	2.4	1.7	1.8	2.1	2.3
世界	100	100	100	100	100	100	100	100	100	100	100	100	100

□□□□13.1



□13.1 1750—1980□□□□□□□□□□□13.2□□

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[illegible][3][illegible]·[illegible]Caglar Keyder[illegible]“[illegible]”[illegible]19[illegible]1780—1914[illegible][4][illegible]“[illegible]”[illegible]1801[illegible]1793[illegible]1784[illegible]1708[illegible]Montgofier[illegible]Antonnay[illegible]1783[illegible]13.3[illegible]1837[illegible][5][illegible]

[illegible]13.3[illegible]1700—1831[illegible]

年份	国民生产增长率		人均国民生产增长率	
	国民生产（每年%）	隐式倍增时间（年）	人均国民生产（每年%）	隐式倍增时间（年）
1700—1760	0.69	100	0.31	223
1760—1780	0.70	99	0.01	6931
1780—1801	1.32	53	0.35	198
1801—1831	1.97	36	0.52	134

[illegible]N. F. R. [illegible]1985[illegible]45[illegible]
[illegible]“[illegible]”[illegible]

[illegible]19[illegible]N. F. R. [illegible]18[illegible][6][illegible]

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[illegible]—[illegible]18[illegible]——[illegible]——[illegible][7]

18[illegible][8][illegible]18[illegible]

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[illegible]25%——30%[illegible][9][illegible]17[illegible]50[illegible]“[illegible]1/4[illegible]”[illegible]·[illegible]Gregory King[illegible]1688[illegible]40%[illegible]“[illegible]”[illegible]“[illegible]”[illegible][10][illegible]1700[illegible]10%[illegible]——[illegible]·[illegible]42‰[illegible][11]

18[illegible]37%[illegible]20%[illegible]16%[illegible]20%[illegible]7%[illegible][12][illegible]50%[illegible]

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[illegible]18—19[illegible]18[illegible]17—18[illegible]

[illegible]16[illegible]——[illegible]——[illegible]18[illegible]18[illegible]

[illegible]W.G. [illegible]Hoskins[illegible]·[illegible]Wigston Magna[illegible]“[illegible]”[illegible]

[illegible]16[illegible]——[illegible][13]

[illegible]·[illegible]1765[illegible]60[illegible][14]

[illegible]100[illegible]17[illegible]12%[illegible]57%[illegible][15][illegible]

[illegible]“[illegible]”——[illegible]·[illegible]“[illegible]1750[illegible]”[16]

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[illegible]1700—1800[illegible]37%[illegible][17][illegible]1700—1850[illegible]3[illegible]61%[illegible]1700[illegible]29%[illegible]1840[illegible]1840[illegible]1750[illegible]1170[illegible][18][illegible]13.4[illegible]

[illegible]13.4 [illegible]1700—1850[illegible]

	1700	1750	1800	1850
农作物				
谷物（蒲式耳）	65	88	131	181
肉类（磅）	370	665	888	1356
羊毛（磅）	40	60	90	120
奶酪（磅）	61	84	112	157
1815 年的批发价格（英镑）				
谷物和土豆	19	25	37	56
畜牧产品	21	34	51	79
总计	40	59	88	135

[illegible]·[illegible]1700-1820[illegible]2[illegible]1994[illegible]81[illegible]R. C. [illegible]1700[illegible]·[illegible]Roderick Floud[illegible]·[illegible]Donald McCloskey[illegible]2[illegible]1994[illegible]1[illegible]109[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

18[illegible]18[illegible]19[illegible][19][illegible]

[illegible]——[illegible]

[illegible]18[illegible]1651[illegible]1660[illegible]17[illegible]

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[illegible]“[illegible]”[illegible]18[illegible]19[illegible]4000[illegible]

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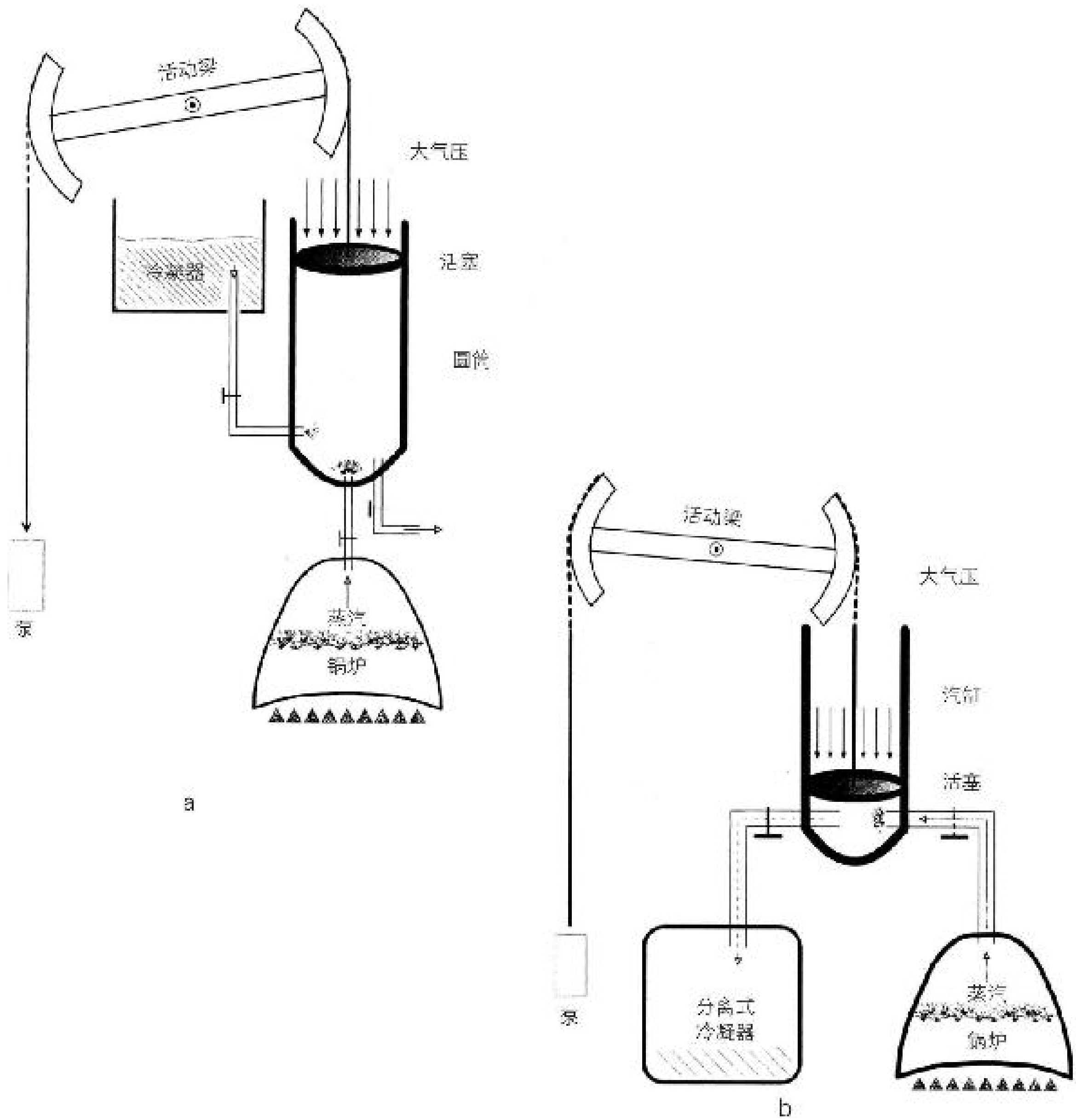
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[illegible]—[illegible]

[illegible]·[illegible]18[illegible]60[illegible]13.2[illegible]1790[illegible]1800[illegible]200—300[illegible]6000[illegible]5000[illegible]



[illegible]13.2 18[illegible]

a.[illegible]1712[illegible]“[illegible]”[illegible]b. 1769[illegible]·[illegible]·E.[illegible]·[illegible]·[illegible]1999[illegible]282[illegible]13.1[illegible]284[illegible]13.2[illegible]1999[illegible]

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□13.5 □□1770—1831□□□□□□□

部门	产品	1770	1801	1831
纺织	棉花	0.6	9.2	25.3
	羊毛	7.0	10.2	15.9
	麻	1.9	2.6	5.0
	丝绸	1.0	2.0	5.8
煤和金属	煤	0.9	2.7	7.9
	铁	1.5	4.0	7.6
	铜	0.2	0.9	0.8
建筑	住房	2.4	9.3	26.5
消费品	啤酒	1.3	2.5	5.2
	皮革[1]	5.1	8.4	9.8
	肥皂	0.3	0.8	1.2
	蜡烛	0.5	1.0	1.2
	纸	0.1	0.6	0.8
总计		22.8	54.2	113.0

[illegible]·[illegible]1700—1820[illegible]2[illegible]1994[illegible]38[illegible][30]

[illegible]·[illegible]

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[illegible][32]

[illegible]13.5[illegible]·[illegible]

[illegible]——[illegible]——[illegible]“[illegible]”[illegible][33]

[illegible]18[illegible]·[illegible]“[illegible]”[illegible][34]18[illegible]——[illegible]

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[illegible]17—18[illegible]19[illegible]“[illegible]”[illegible]·[illegible]

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[illegible][36][illegible]17[illegible]18[illegible]“[illegible]”[illegible]1000[illegible]

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[illegible]1750[illegible]18[illegible][37]

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[illegible]“[illegible]”[illegible]——[illegible]“[illegible]”[39]——[illegible]

[illegible]1790[illegible]·[illegible]“[illegible]”[illegible][40]

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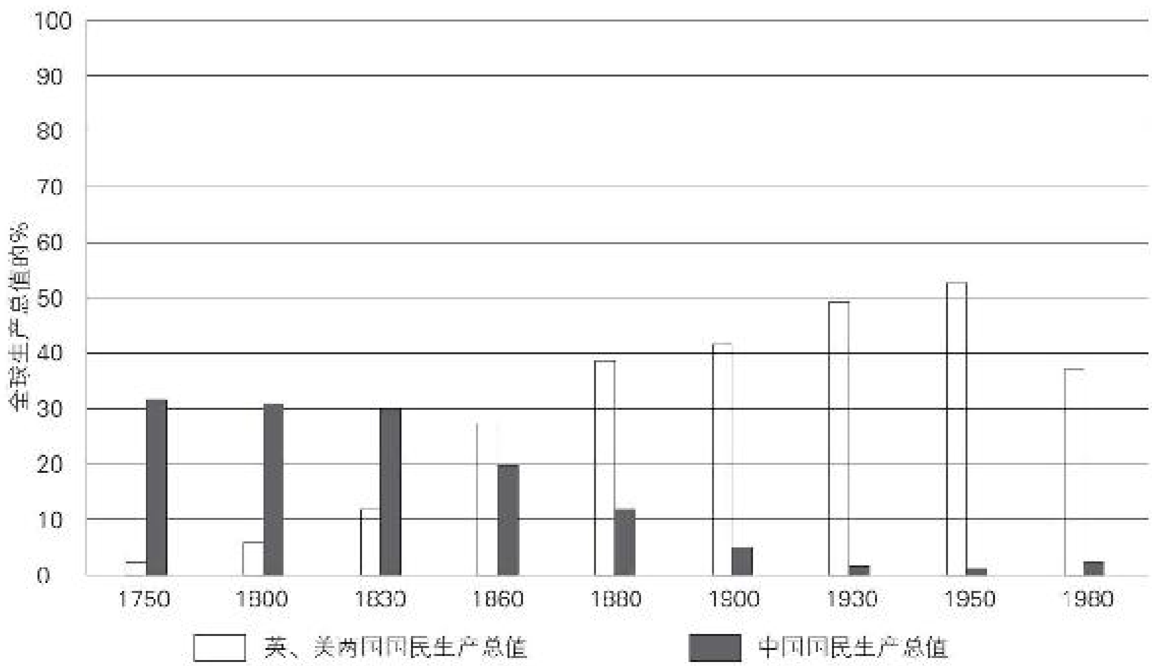
[illegible]“[illegible]”[illegible][50][illegible]18[illegible]19[illegible]19[illegible]20—30[illegible]19[illegible]70[illegible]·[illegible]——[illegible]——[illegible]

[illegible]1900[illegible]24%[illegible]19%[illegible]13%[illegible]13.2[illegible][51][illegible]19[illegible]20[illegible]

[illegible]——[illegible]19[illegible][52][illegible]

1842[illegible]
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[illegible]1969[illegible]·[illegible]1750[illegible]
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·[illegible]Pat Hudson[illegible]1992[illegible]E. A.[illegible]
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[1] [illegible]·[illegible]19[illegible]1981[illegible]3[illegible]

[2] [illegible]·[illegible]·[illegible]·[illegible]1993[illegible]2[illegible]“[illegible]”[illegible]5[illegible]——[illegible]1997[illegible]279[illegible]“[illegible]1780—1880[illegible]”

[3] [illegible]·[illegible]Alexander Geschenkron[illegible]1962[illegible]

[4] [illegible]·[illegible]·[illegible]1780—1914[illegible]20[illegible]1978[illegible]196[illegible]

[5] [illegible]·[illegible]Cary Hwake[illegible]·[illegible]54[illegible]

[6] N. F. R.[illegible]1985[illegible]115[illegible]

[7] [illegible]·[illegible]1990[illegible]100—109[illegible]

[8] [illegible]·[illegible]125—155[illegible]

[9] [illegible]·[illegible]·[illegible]·[illegible]1979[illegible]108[illegible]

[10] [illegible]·[illegible]·[illegible]108[illegible]·[illegible]13[illegible]

[11] [illegible]·[illegible]11[illegible]

[12] [illegible]13[illegible]16[illegible]

[13] W. G. [illegible]1965[illegible]269[illegible]·[illegible]1700—1820[illegible]2[illegible]1994[illegible]85[illegible]

[14] [illegible]·[illegible]2[illegible]1987[illegible]206[illegible]

[15] [illegible]1700—1820[illegible]80[illegible]

[16] [illegible]1969[illegible]28—29[illegible]

[17] [illegible]62—63[illegible]

[18] [illegible]62[illegible]121[illegible]

[19] [illegible]18[illegible]0.2%——0.3%[illegible]1801—1830[illegible]0.7%[illegible]1831—1860[illegible]1.0%[illegible]2[illegible]76—77[illegible]81[illegible]

[20] [illegible]·E.[illegible]James E. McClellan III[illegible]·[illegible]Harold Dorn[illegible]·[illegible]1999[illegible]279[illegible]

[21] [illegible]·[illegible]Arnold Pacey[illegible]1990[illegible]113[illegible]

[22] [illegible]280—281[illegible]

[23] [illegible]84—85[illegible]

[24] [illegible]96—98[illegible]

[25] [illegible]111[illegible]

[26] [illegible]·[illegible]2[illegible]1995[illegible]124—125[illegible]

[27] [illegible]125[illegible]

[28] [illegible]1990[illegible]106[illegible]117—119[illegible]

[29] [illegible]1970[illegible]202[illegible]·[illegible]George Basalla[illegible]1988[illegible]40[illegible]

[30] [illegible]Lather[illegible]——[illegible]

[31] [illegible]·[illegible]1700—1914[illegible]2[illegible]1983[illegible]124—125[illegible]287—289[illegible]

[32] [illegible]·[illegible]1997[illegible]50—51[illegible]

[33] [illegible]50—51[illegible]

[34] [illegible]·[illegible]87[illegible]

[35] [illegible]·[illegible]990—1992[illegible]1992[illegible]96[illegible]

[36] [illegible]·[illegible]“[illegible]”[illegible]990—1992[illegible]3[illegible]

[37] [illegible]990—1992[illegible]103—104[illegible]

[38] [illegible]990—1992[illegible]106—107[illegible]

[39] [illegible]·[illegible]——[illegible]1985[illegible]·[illegible]

[40] [illegible]990—1992[illegible]110[illegible]

[41] [illegible]——[illegible]152[illegible]

[42] [illegible]E. P. [illegible]1975[illegible]·[illegible]1968[illegible]

[43] [illegible]·[illegible]1957[illegible]

[44] [illegible]·[illegible]John Merson[illegible]1989[illegible]83[illegible]

[45] [illegible]·[illegible]70[illegible]

[46] [illegible]221[illegible]

[47] [illegible]98[illegible]

[48] [illegible]134—135[illegible]

[49] [illegible]

[50] [illegible]·[illegible]300[illegible]B. L. [illegible]1990[illegible]55—67[illegible]

[51] [illegible]·[illegible]Richard Barff[illegible]20[illegible]R. J. [illegible]·L. [illegible]·L. [illegible]1995[illegible]51[illegible]

[52] [illegible]·[illegible]Mike David[illegible]2001[illegible]51[illegible]

[53] [illegible]·[illegible]16[illegible]3[illegible]

[54] [illegible]·[illegible]115[illegible]

[55] [illegible]1997[illegible]

[illegible]14[illegible]
20[illegible]

[illegible]20[illegible]

[illegible]

[illegible][1]

[illegible]

20[illegible]20[illegible]·[illegible]“[illegible]”20[illegible]1994[illegible]20[illegible]20[illegible]·[illegible]“[illegible]20[illegible]”[illegible][2]

[illegible]20[illegible]20[illegible]20[illegible]

[illegible]

[illegible]20[illegible]

[illegible]·[illegible]“[illegible]——[illegible]——[illegible]”[3][illegible]D. J.[illegible]Bradley[illegible]“[illegible]”[illegible]40[illegible]10[illegible]400[illegible]4000[illegible][4]

1940[illegible]·[illegible]20[illegible]

> [illegible]Klee[illegible]“[illegible]”[illegible]*Angelus Novus*[illegible][5]

[illegible]·[illegible][6]

[illegible]20[illegible]10[illegible]4000[illegible]

[illegible]14.1[illegible][7][illegible]1900[illegible]16[illegible]60[illegible]10[illegible]10[illegible]5[illegible]10[illegible]80[illegible]40[illegible]

[illegible]

20[illegible]

[illegible]18[illegible]20[illegible]1900—2000[illegible]3[illegible]4[illegible]4[illegible]20[illegible][8]20[illegible]

[illegible]20[illegible]19[illegible][9][illegible]19[illegible]20[illegible][10][illegible]·[illegible]13.1[illegible]13.2[illegible]19[illegible]20[illegible]

[illegible]14.1 1900—2000[illegible]

年代	人口（10亿）
1900	1.634
1910	1.746
1920	1.857
1930	2.036
1940	2.267
1950	2.515
1960	3.019
1970	3.698
1980	4.450
1990	5.292
2000	6.100

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排位	政治单元	公司	价值（10 亿美元）
1	美国		15013
2	日本		4224

排位	政治单元	公司	价值（10 亿美元）
3	英国		2775
4	法国		1304
5	德国		1229
6	加拿大		695
7	瑞士		662
8	荷兰		618
9	意大利		610
10		微软（美）	546
11	香港		536
12		通用电器（美）	498
13	澳大利亚		424
14	西班牙		390
15		思科系统（美）	355
16	中国台湾		339
17	瑞典		318
18		英特尔（美）	305
19		埃克森–美孚（美）	295
20		沃尔玛（美）	289
21	韩国		285
22	芬兰		276
23		日本航空（日）	274
24		美国在线–时代华纳	289[1]
25	南非		232
26		诺基亚（芬兰）	218
27	希腊		217
28		德国电气（德）	218
29		IBM（美）	213
30	巴西		194

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19 · · John Maynard Keynes 20

20 [15]

1990 100 80 100 80 65 100 60 [16]

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[illegible]

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20[illegible]20[illegible]

[illegible]1900[illegible]1500[illegible]1998[illegible]6600[illegible]——[illegible]35[illegible]66[illegible][17][illegible]14.3[illegible]14.4[illegible]2000[illegible]34 100[illegible]27 680[illegible]3580[illegible]200[illegible]840[illegible]450[illegible]210[illegible]14.3[illegible]1%[illegible]1.5%[illegible]14.4[illegible]

[illegible]14.3 2000[illegible]

国家或地区	收入（美元）
世界	5170
美国	34 100
高收入国家平均值	27 680
布基纳法索	210
撒哈拉以南非洲	470
印度	450
中国	840
巴西	3580
拉丁美洲和加勒比海地区	3670

[illegible]2002[illegible]1.1[illegible]18—20[illegible]

[illegible]14.4 2000[illegible]

国家或地区	期望寿命（岁）	
	男子	女子
世界	65	69
美国	74	80
高收入国家平均值	75	81
布基纳法索	44	45
撒哈拉以南非洲	46	47
印度	62	63
中国	69	72
巴西	64	72
拉丁美洲和加勒比海地区	67	74

[illegible]2002[illegible]1.5[illegible]32—34[illegible]

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□14.5 1994□□□□□□□□□□□□

地区	人口（百万）	自然增长（%／年）	出生率（‰）	死亡率（‰）	期望寿命（出生时）	人均GDP（1992年，美元）
世界	5607	1.6	25	9	65	4 340
比较发达	1164	0.3	12	10	75	16 610
欠发达	4443	1.9	28	9	63	950
非洲	700	2.9	42	13	55	650
亚洲	3392	1.7	25	8	64	1 820
拉丁美洲和加勒比海地区	470	2.0	27	7	68	2 710
欧洲	728	0.1	12	11	73	11 990
北美	290	0.7	16	9	76	22 840
大洋洲	28	1.2	20	8	73	13 040

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[illegible]·[illegible]20[illegible]80[illegible]Sahel[illegible]

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> [illegible]12[illegible]34[illegible]5[illegible]……[illegible]……[illegible]5/6[illegible]12[illegible]

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> [illegible]50[illegible][25]

[illegible]1988[illegible]“[illegible]”[illegible]8.8%[illegible][26]

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[illegible] 20 [illegible] [29] [illegible] 20 [illegible] 30 [illegible]

[illegible]1949[illegible]——[illegible]20[illegible]24%[illegible]2%[illegible][30][illegible]

[illegible]——[illegible]20[illegible]30[illegible]50[illegible]——[illegible]·[illegible]

> [illegible]——[illegible]20[illegible]70[illegible]——[illegible]……[illegible]“[illegible]”[illegible]
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> [illegible]15[illegible]20[illegible]80[illegible][31]

[illegible]20[illegible]90[illegible]

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□14.6 1500—1999□□□□□□□□□□□

年份	战争死亡（百万）	每1000人死亡数
1500—1599	1.6	3.2
1600—1699	6.1	11.2
1700—1799	7.0	9.7
1800—1899	19.4	16.2
1900—1999	109.7	44.4

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[illegible]10%[illegible]13%[illegible][35][illegible]20[illegible]90[illegible]40%[illegible]2001[illegible]9[illegible]11[illegible]“[illegible]”[illegible][36][illegible]

[illegible]

20[illegible]“[illegible]300[illegible]”[37]

[illegible]6.1[illegible]20[illegible]20[illegible]60 000—90 000[illegible]20[illegible]“[illegible]”[illegible]net primary productivity[illegible]25%[illegible]40%[illegible]140[illegible]

[illegible]1966[illegible]20%[illegible][38][illegible]·[illegible]Richard Leakey[illegible]65%[illegible][39]

[illegible]120[illegible]20[illegible]

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190—200ppm□□□□□□□□1800□□□□□□□□□□□□280ppm□□□□□□□□
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□□350 ppm□□□□□□□□□□□□□□□□□□□□□□□□□2150□□□□□□□□□□□
□□□550—600 ppm□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
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20□□90□□□□□□□□□□□□□□□□□□□□·W.□□□□□□□□□□·C.□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□10□□□□□□□□□□□□□□□□□□□□1□□□1985□□□□□□□□□□□□□□□□□□□□□□□□□□□□25%□50%□□□75%□□□□□□□□□14.7□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1985□□□□50%□□□7□□□□□□1945—1985□□40□□□□□□□□□10000□□□□[45]□□□□□□□□——□□□□□□□□□□□□□□□□□——□□□□□50%□□□□20□□□□□□□6.1□□□□□□□□□□□□□□□□□□□□□□20□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□14.7 □□□1□□□20□□80□□□□□□□□□□□□□

转型的类型	四分位值（与 1985 年相比）		
	25%	50%	75%
森林消失的地区	1700	1850	1915
陆地脊椎动物的多样性	1790	1880	1910
取水量	1925	1955	1975
人口规模	1850	1950	1970
碳释放	1815	1920	1960
硫释放	1940	1960	1970
磷释放	1955	1975	1980
氮释放	1970	1975	1980
铅释放	1920	1950	1965
四氯化碳生产	1950	1960	1970

[illegible]·W. [illegible]B. L. [illegible]·C. [illegible]300[illegible]B·L·[illegible]1990[illegible]7[illegible]

[illegible]20[illegible]20[illegible]——[illegible]

[illegible]

20[illegible]

[illegible]20[illegible]21[illegible]20[illegible]20[illegible]

[illegible]

[illegible]·R. [illegible]2000[illegible]·[illegible]1994[illegible]·[illegible]3[illegible]1996——1998[illegible]20[illegible]B. L.[illegible]1990[illegible]·[illegible]1984[illegible]——[illegible]·[illegible]David Held[illegible]1999[illegible]·[illegible]1992[illegible]·[illegible]21[illegible]1994[illegible]

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[1] [illegible]·[illegible]Yehudi Menuhin[illegible]E. J. [illegible]1994[illegible]2[illegible]·[illegible]Giovanna Borgese[illegible]Mi pare un secolo: Ritrati e parole di centosei protagonisti del Novecento[illegible]1992[illegible]

[2] [illegible]·R. [illegible]

[3] [illegible]·[illegible]51[illegible]

[4] D. J. [illegible]·[illegible]Andrew Cliff[illegible]·[illegible]Peter Haggett[illegible]20[illegible]R. J. [illegible]·L. [illegible]·L. [illegible]1995[illegible]206—223[illegible]207[illegible]208[illegible]

[5] [illegible]·[illegible]·[illegible]Hannah Arendt[illegible]·[illegible]Harry Zohn[illegible]·[illegible]1970[illegible]9[illegible]259—260[illegible]

[6] [illegible]“[illegible]”[illegible]15[illegible]

[7] [illegible]·W. [illegible]Robert W. Kates[illegible]B. L. [illegible]Turner II[illegible]·C. [illegible]William C. Clark[illegible]300[illegible]B. L. [illegible]1990[illegible]11[illegible]

[8] [illegible]·R. [illegible]Lester R. Brown[illegible]1999[illegible]1999[illegible]115—116[illegible]

[9] [illegible]·R. [illegible]55—67[illegible]

[10] [illegible]·[illegible]20[illegible]51[illegible]

[11] [illegible]·[illegible]1[illegible]1996[illegible]2[illegible]1997[illegible]3[illegible]1998[illegible]

[12] [illegible]59[illegible]

[13] [illegible]——[illegible]

[14] [illegible]1999[illegible]10[illegible]

[15] [illegible]·[illegible]·[illegible]·[illegible]Richard and Lee Meadows Jantz[illegible]J. J.[illegible]Stambaugh[illegible]“[illegible]1800[illegible]”[illegible]2001[illegible]12[illegible]22[illegible]

[16] [illegible]·[illegible]Susan Christopherson[illegible]202[illegible]310—319[illegible]

[17] [illegible]1999[illegible]10[illegible]

[18] [illegible]·R. [illegible]1995[illegible]1995[illegible]176[illegible]

[19] [illegible]·[illegible]Paul Kennedy[illegible]21[illegible]1994[illegible]215[illegible]

[20] [illegible]1999[illegible]10[illegible]

[21] [illegible]·[illegible]2[illegible]1981[illegible]11[illegible]

[22] [illegible]1999[illegible]12[illegible]

[23] “98CD[illegible]”[illegible]1994—1997[illegible]“[illegible]”[illegible]

[24] [illegible]289[illegible]289—291[illegible]

[25] [illegible]·[illegible]67[illegible]

[26] [illegible]1995[illegible]12[illegible]

[27] [illegible]2[illegible]1975[illegible]213[illegible]

[28] [illegible]·[illegible]1990[illegible]143[illegible]·T. [illegible]Courtwright[illegible]31—36[illegible]

[29] [illegible]

[30] [illegible]·[illegible]Robert Lewis[illegible]1913—1945[illegible]R. W. [illegible]Davies[illegible]·[illegible]Mark Harrison[illegible]S. G. [illegible]Wheatcroft[illegible]1994[illegible]182—197[illegible]194[illegible]41[illegible]310[illegible]

[31] [illegible]·[illegible]1987[illegible]18—19[illegible]

[32] [illegible]·[illegible]990—1992[illegible]1992[illegible]73[illegible]

[33] [illegible]1999[illegible]154—155[illegible]

[34] [illegible]67[illegible]

[35] [illegible]1999[illegible]155—156[illegible]

[36] [illegible]1999[illegible]159[illegible]163[illegible]

[37] [illegible]·F. [illegible]“[illegible]”[illegible]21[illegible]

[38] [illegible]·[illegible]1998—1999[illegible]1998[illegible]128[illegible]

[39] [illegible]·[illegible]·[illegible]1995[illegible]45[illegible]

[40] [illegible]1999[illegible]116—117[illegible]123[illegible]

[41] [illegible]·[illegible]W. W. [illegible]2001[illegible]93[illegible]

[42] [illegible]·[illegible]21[illegible]112[illegible]2001[illegible]

[43] [illegible]1999[illegible]11[illegible]

[44] [illegible]1999[illegible]116[illegible]

[45] [illegible]12[illegible]

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[illegible]15[illegible]
[illegible]

[illegible]——[illegible]

[illegible]

[illegible][1]

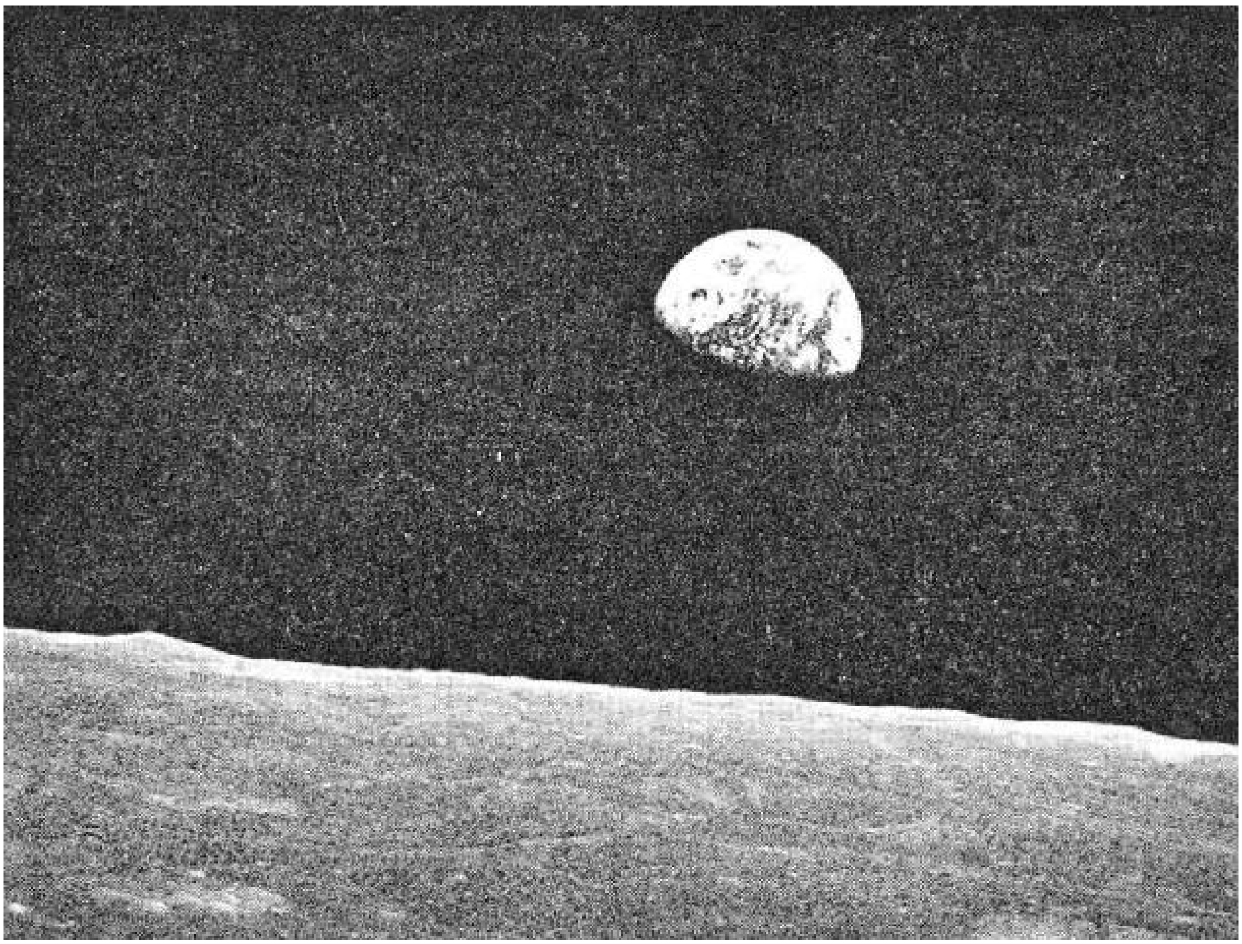
[illegible]

[illegible]19[illegible]20[illegible]90[illegible]

[illegible]

[illegible][2][illegible]·[illegible]Richard Solé[illegible]·[illegible]Brian Goodwin[illegible]“[illegible][3]

[illegible]



[illegible]15.1 [illegible]

[illegible]1968[illegible]12[illegible]8[illegible]·[illegible]William Anders[illegible]1998[illegible]“[illegible]”[illegible]·[illegible]·[illegible]8[illegible]2000[illegible]http://www.i20.uva.Nl/inhoud/gig/Apollo%208%20US. pdf[illegible]accesed April 2003[illegible]

[illegible]·[illegible]20[illegible]“[illegible]1955[illegible]1952[illegible]10%[illegible]1966[illegible]1966[illegible]”[4][illegible]R. G.[illegible]Collinwood[illegible]“[illegible]”[5]

[illegible]1000[illegible]

[illegible]——[illegible]——[illegible]……[illegible]

[illegible]

[illegible]100[illegible]“[illegible]”[illegible]

[illegible]

“[illegible]”[illegible]——[illegible]“[illegible]”[illegible]——[illegible]·[illegible]Jean-Marie Sawadogo[illegible]55[illegible]

[illegible]Pheleus[illegible]“[illegible]”[illegible]

[illegible]20[illegible]

[illegible]

[illegible]·[illegible]Herman Kahn[illegible]1966[illegible]·[illegible]Donella Meadows[illegible]1972[illegible][6][illegible]1[illegible]2[illegible]3[illegible]

[illegible]·[illegible]1992[illegible][7][illegible]3500[illegible]2000[illegible]1722[illegible]3000[illegible]600[illegible]6[illegible]Topknot[illegible]10[illegible]18[illegible]18[illegible]20[illegible]

1500 Marquesas 22.5 11

700 ahus

500 7000 ——

[illegible]3000[illegible]1000[illegible]

[illegible]1928[illegible]“[illegible]……[illegible]3[illegible]”[8][illegible]

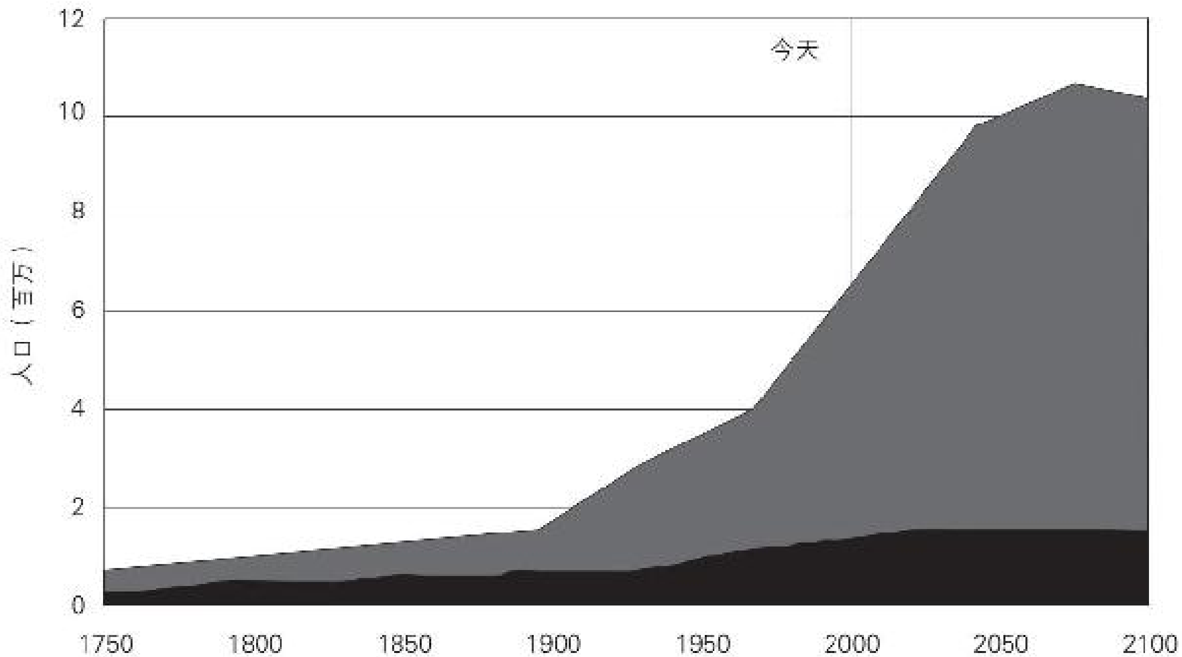
[illegible][9][illegible]

[illegible]20[illegible]——[illegible]

[illegible]1998[illegible]33[illegible][10][illegible]90[illegible]——100[illegible]30[illegible]——40[illegible]20[illegible]15.2[illegible]

[illegible]20[illegible]

[illegible]20[illegible]



今天
12
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人口（百万）
1750
1800
1850
1900
1950
2000
2050
2100

[illegible]20[illegible]80[illegible]“[illegible]”[illegible]1985[illegible]1987[illegible]1999[illegible]50%[illegible]1999[illegible]5[illegible]80[illegible]2000[illegible]1990[illegible]32[illegible]10[illegible]1986[illegible]110[illegible]1996[illegible]16[illegible]

[illegible]·[illegible]“[illegible]1979[illegible]1987[illegible]1988[illegible]60%[illegible]1990[illegible]”[12]

[illegible]——[illegible]·[illegible]·[illegible]20[illegible]30[illegible]

[illegible]——[illegible]

[illegible]“[illegible]”[illegible]——[illegible]——[illegible]

[illegible]

[illegible]

[illegible]·[illegible]“[illegible]”[illegible]“[illegible]”[illegible][13][illegible]

[illegible]Icarus[illegible][14][illegible]——[illegible]

[illegible]

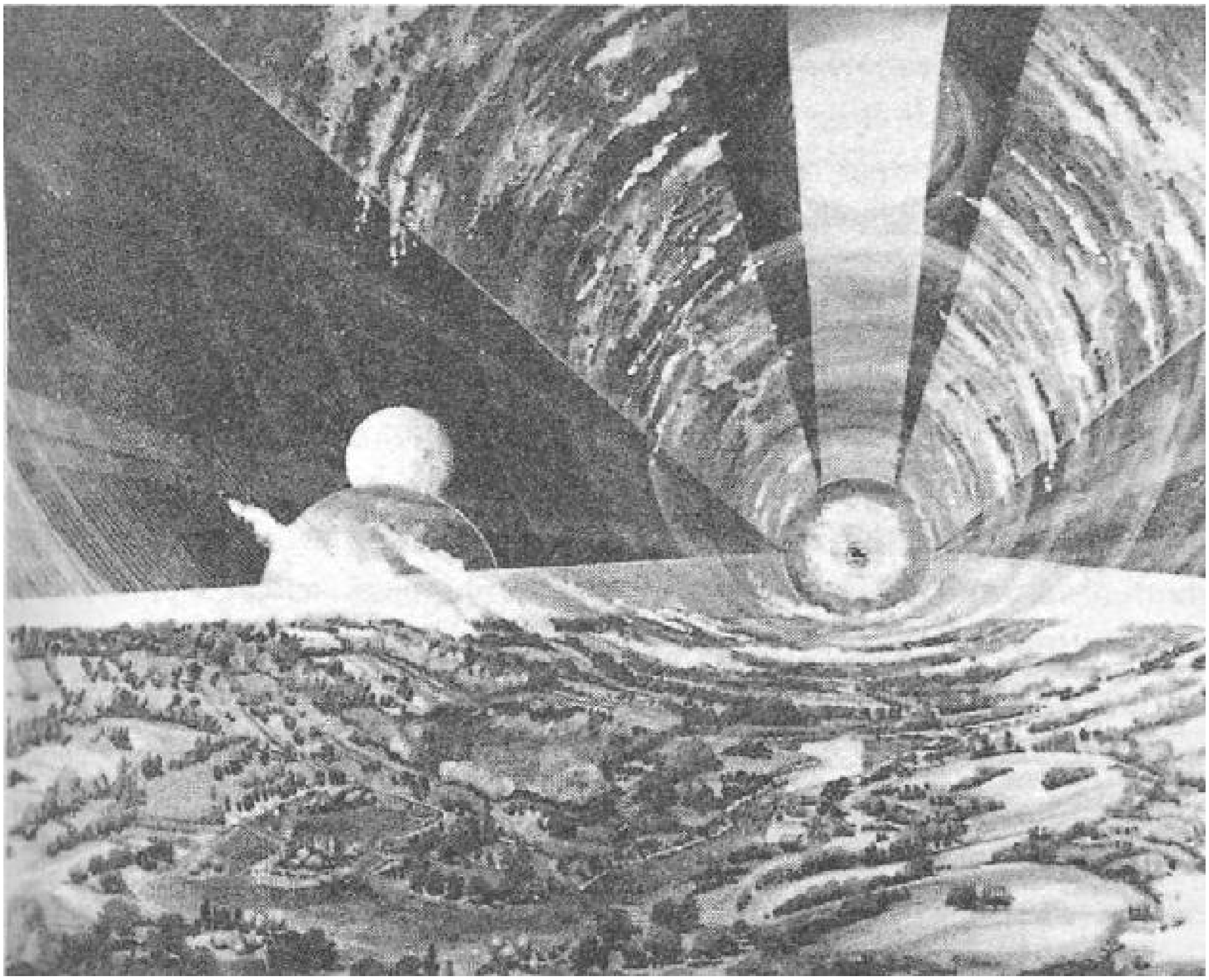
[illegible]5000[illegible]

[illegible]——[illegible]——[illegible]100[illegible]——120[illegible]·[illegible]Konstantin Tsiokovsky[illegible]1961[illegible]4[illegible]12[illegible]1969[illegible]6[illegible]21

[illegible]500[illegible]

[illegible]“[illegible]”——[illegible]
[15][illegible]1000[illegible]“[illegible]”[illegible]

[illegible][16][illegible]4[illegible]30 000[illegible]1/10[illegible]“[illegible]”[illegible]15.3[illegible]



□15.3 □□□□□□□□□□□□□□□□□□□□

□□□□□·K.□□□□Gerard K. O’Neil□□20□□70□□□80□□□□ … 30□□□□□□□□□□□□□□□□□□□□“□□”□□□□□□□□“□□”□□□□□□□□□□□□□□·□□□□□□□□□□□□□□□□ … □□□□□□□□□□□□□□□□□□□□□□□2000□□□□42□

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[illegible]20[illegible][18][illegible]

[illegible]——[illegible]——[illegible]40[illegible]1950[illegible]·[illegible]Los Alamos[illegible]“[illegible]”[illegible][19][illegible]

[illegible]1000[illegible]6500[illegible]

[illegible]

[illegible]

[illegible]40[illegible]

[illegible]30[illegible][20][illegible]

[illegible]6000[illegible]·[illegible]“[illegible]2000℃[illegible]3/4[illegible]”[21][illegible]——[illegible]——[illegible]

[illegible]——[illegible]90%[illegible][22]

[illegible]“[illegible]”[illegible]Big Crunches[illegible][23][illegible]

[illegible]20[illegible]90[illegible]——[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]1030[illegible]

[illegible]·[illegible]20[illegible]70[illegible]10[illegible]10[illegible]15.1[illegible]1030[illegible]“[illegible]”[24][illegible]·[illegible]“[illegible]——[illegible]”[25]

[illegible]15.1 [illegible]

大爆炸以来的时间（年）	重大事件
10^{14}	大多数恒星都死亡了；主宰宇宙的是冷物质、黑矮星、中子星、死亡的行星和小行星，以及星际黑洞；随着宇宙的膨胀，幸存下来的物质都是相互分离的。
10^{20}	许多物体都飘离星系；那些残留的物体塌陷到星系的黑洞里面。
10^{32}	质子大多毁坏，留下一个由能量、轻子和黑洞组成的宇宙。
10^{66}—10^{106}	星际和恒星黑洞蒸发。
10^{1500}	经过量子“通道”，剩下的物质转变为铁。
10^{1076}	剩下的物质转变为中子物质，然后变为黑洞，蒸发。

[illegible]·[illegible]2000[illegible]263[illegible]

[illegible] [26]

[illegible]——[illegible]

[illegible]

[illegible]

[illegible]40[illegible]130[illegible]

[illegible]

[illegible]·[illegible]21[illegible]1996[illegible]·[illegible]1999[illegible]·[illegible]2001[illegible]·[illegible]Bjørn Lomborg[illegible]2001[illegible]·[illegible]21[illegible]1994[illegible]·[illegible]·[illegible]1985[illegible]“[illegible]”[illegible]·[illegible]Walter Miller[illegible]1959[illegible]·[illegible]2000[illegible]·[illegible]1995[illegible]

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[1] [illegible]·[illegible]——[illegible]Murray Gell-Mann[illegible]·[illegible]Yorick Blumenfeld[illegible]20[illegible]1999[illegible]79[illegible]471[illegible]·[illegible]1993[illegible]149[illegible]111-A-D[illegible]115[illegible]

[2] [illegible]·[illegible]·[illegible]20[illegible]

[3] [illegible]20[illegible]

[4] [illegible]·N.[illegible]21[illegible]1996[illegible]158[illegible]

[5] R. C. [illegible]1956[illegible]54[illegible]·[illegible]·[illegible]John Lewis Gaddis[illegible]2002[illegible]58[illegible]

[6] [illegible]·[illegible]7—23[illegible]·[illegible]1960[illegible]·H.[illegible]1972[illegible]·[illegible]21[illegible]——[illegible]2003[illegible]

[7] [illegible]·[illegible]

[8] [illegible]·R. [illegible]330[illegible]

[9] [illegible]·R. [illegible]W. W. [illegible]2001[illegible]——[illegible]61—79[illegible]

[10] [illegible]·R. [illegible]·[illegible]Jannifer Michell[illegible]1998[illegible]1998[illegible]174[illegible]

[11] [illegible]·[illegible]Gareth Poter[illegible]·[illegible]·[illegible]Janet Welsh Brown[illegible]·S. [illegible]Pamela S. Chasek[illegible]3[illegible]2000[illegible]87—93[illegible]

[12] [illegible]·R. [illegible]1995[illegible]1995[illegible]172[illegible]

[13] [illegible]21[illegible]74[illegible]

[14] [illegible]——[illegible]

[15] [illegible]·[illegible]Nikos Prantzos[illegible]2000[illegible]56[illegible]73[illegible]75—80[illegible]

[16] [illegible]2[illegible]

[17] [illegible]·C. [illegible]19[illegible]

[18] [illegible]·[illegible]Brian Stableford[illegible]·[illegible]Dvid Langford[illegible]2000—3000[illegible]1985[illegible]20[illegible]80[illegible]

[19] [illegible]162—169[illegible]164[illegible]18[illegible]Fontenelle[illegible]·[illegible]1998[illegible]236—244[illegible]

[20] [illegible]209[illegible]

[21] [illegible]214[illegible]

[22] [illegible]225—229[illegible]

[23] □□□□□□□□□□□□□□□□□□□□□□·□□□John Wheeler□□□□□□□□□·□□□□□□□Ken Croswell□□□□□□□□□□□□□□□□□□□□□1996□□□□216□□□□□·□□1988□□□□150—151□□

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地质年代	纪	起始时间（距今）	重大事件
冥古代		46 亿年	太阳系形成；月亮；熔融的液态和“分化”；最古老的岩石，早期大气层
太古代		40 亿年	最早的生命；原核生物
原生代		25 亿年	氧气增加；真核生物
	埃迪卡拉纪	5.9 亿年	最早的多细胞有机体
古生代	寒武纪	5.7 亿年	最早的带有贝壳的有机体
	奥陶纪	5.1 亿年	最早的珊瑚、脊椎动物
	志留纪	4.39 亿年	最早的多骨鱼类、最早的树
	泥盆纪	4.09 亿年	最早的鲨鱼、两栖动物
	石炭纪	3.63 亿年	最早的爬行动物、有翼昆虫；煤形成
	二叠纪	2.9 亿年	生物大灭绝
中生代	三叠纪	2.5 亿年	最早的恐龙、蜥蜴、哺乳动物
	侏罗纪	2.08 亿年	最早的鸟类
	白垩纪	1.46 亿年	最早的开花植物、有袋类动物
新生代（第三纪）	古新世	6500 万年	小行星影响；恐龙灭绝；哺乳动物和开花植物的传播；最早的灵长目
	始新世	5700 万年	最早的猿人
	渐新世	3600 万年	早期类人动物
	中新世	2300 万年	人科动物与猿类分离
	上新世	520 万年	南方古猿、能人
（第四纪）	更新世	160 万年	直立人、现代人
	全新世	1 万年	后冰川时代人类历史

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[1] [illegible]“What is Big History”[illegible]International Big History Association[illegible]*Journal of Big History*[illegible]2017[illegible]1[illegible]·[illegible]·[illegible]Lowell Gustafson[illegible]

[2] [illegible]·[illegible]Jean Bodin[illegible]16[illegible]·[illegible]Craig Benjamin[illegible]·[illegible]——[illegible]Marnie Hughes-Warrinton[illegible]2005[illegible]95[illegible]

[3] E. O. [illegible]1998[illegible]

[4] E. H. [illegible]1954[illegible]7[illegible]1961[illegible]1961[illegible]·[illegible]·[illegible]

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[6] [illegible]·[illegible]Fred Spier[illegible]2[illegible]——[illegible]2015[illegible]·[illegible]Andrea Wulf[illegible]·[illegible]·[illegible]·[illegible]2015[illegible]

[7] [illegible]1962[illegible]·[illegible]2[illegible]1970[illegible]

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[26] [illegible]·[illegible]（John Ziman[illegible]2000[illegible]

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[28] H. G. [illegible]3[illegible]1921[illegible]1102[illegible]

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[39] [illegible]·[illegible]Graham Allison[illegible]·[illegible]Philip Zelikow[illegible]2[illegible]1999[illegible]271[illegible]

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人类简史

Sapiens
Brief History of Humankind

从动物到上帝

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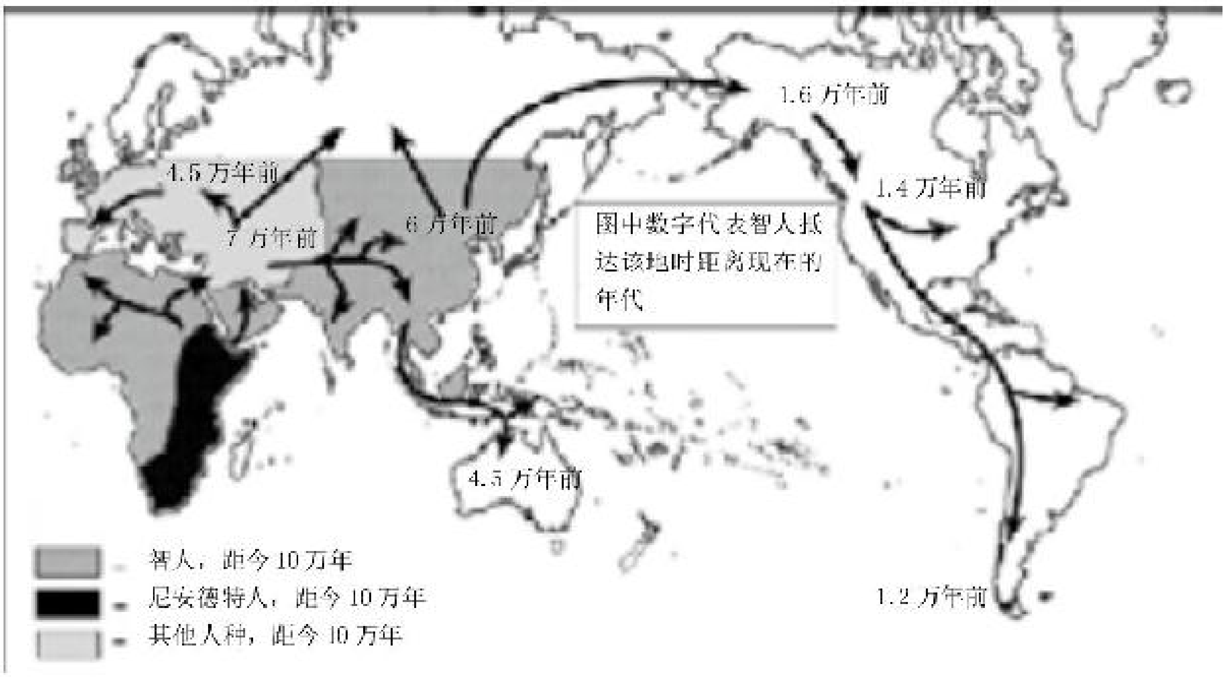
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[1]Ann Gibbons,‘Food for Thought:Did the First Cooked Meals Help Fuel the Dramatic Evolutionary Expansion of the Human Brain?’,Science 316:5831 (2007),1558-1560.

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八卦	能够传达更大量关于智人社会关系的信息	组织更大、更有凝聚力的团体，规模可达150人
虚构故事	能够传达关于虚构概念的信息，例如部落的守护神、国家、有限公司以及人权	1. 大量陌生人之间的合作 2. 社会行为的快速创新

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[2]Robin Dunber,Grooming,Gossip,and the Evolution of Language (Cambridge,Mass.:Harvard University Press,1998).

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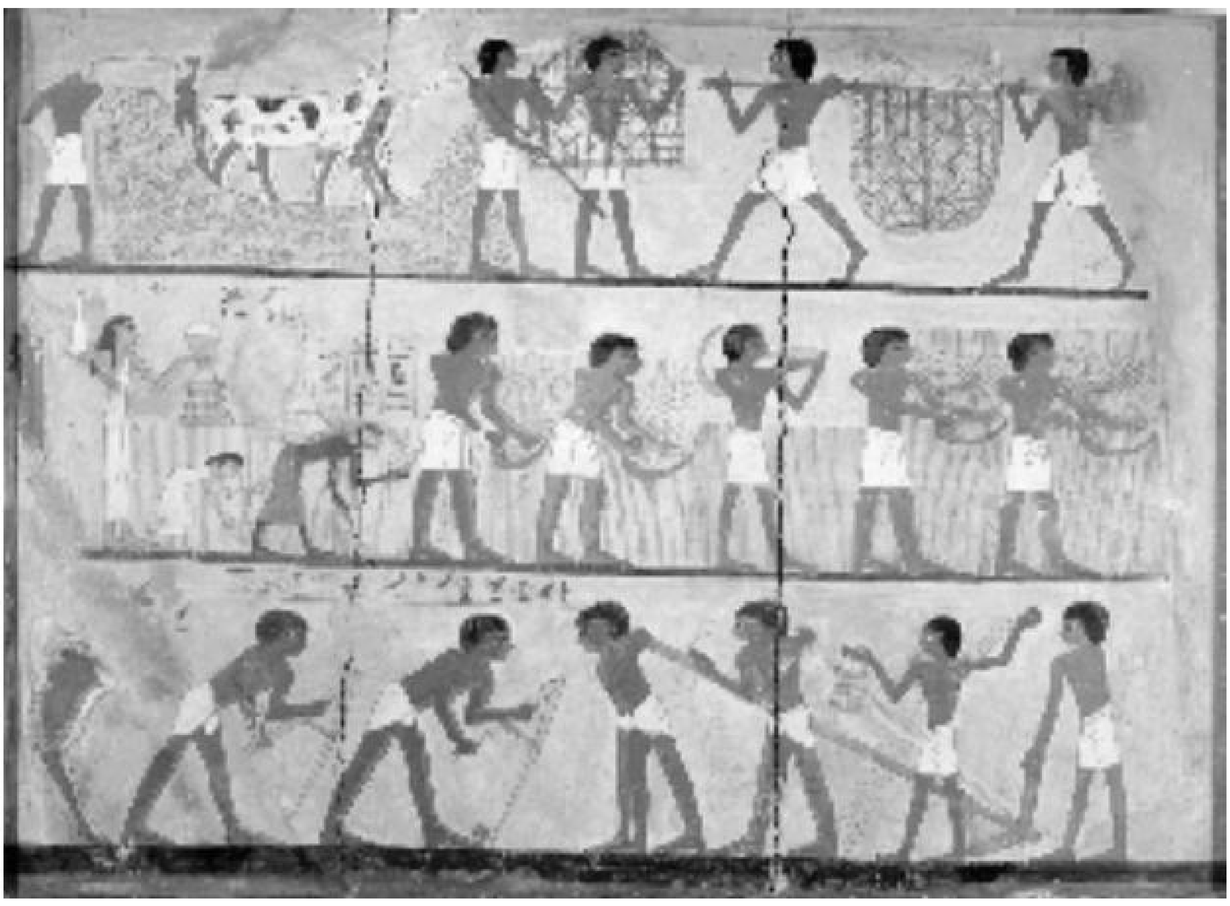
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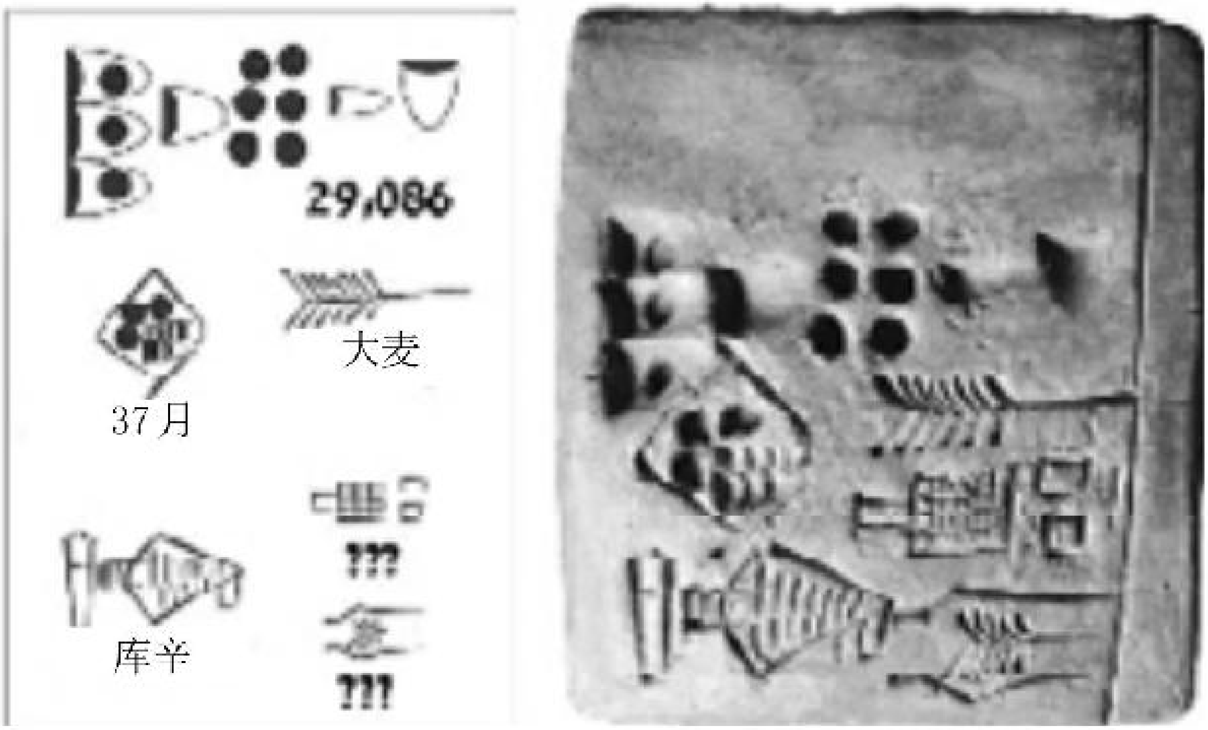
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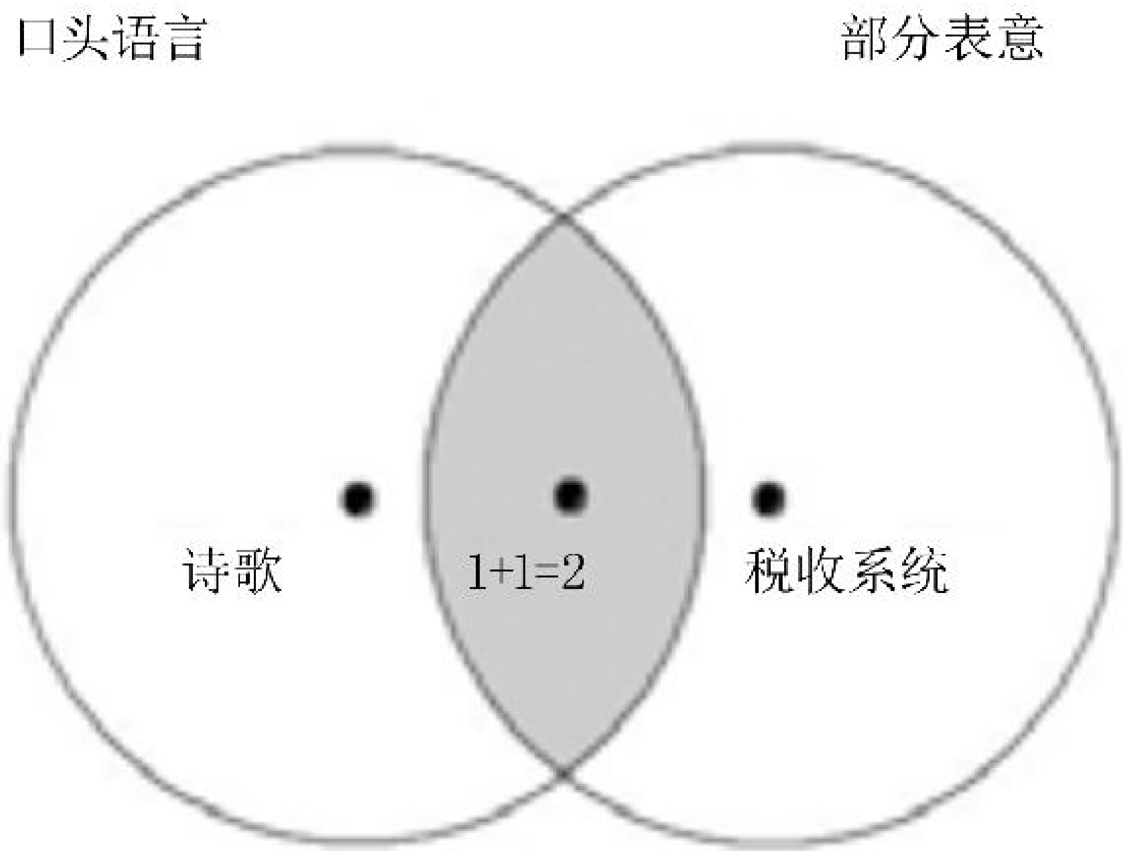
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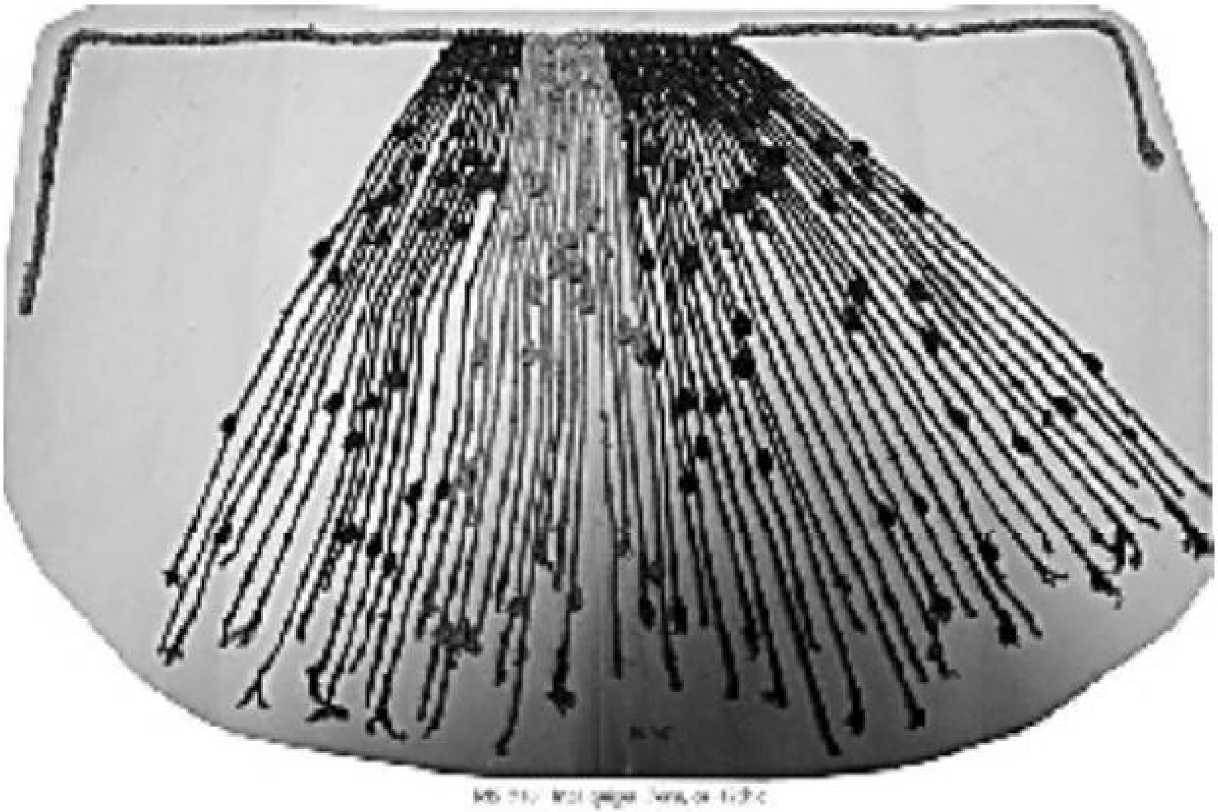
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部分表意
诗歌
1+1=2
税收系统



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$$\begin{aligned}\ddot{\mathbf{r}}_i = \sum_{j\neq i}\frac{\mu_j\left(\mathbf{r}_j-\mathbf{r}_i\right)}{r_{ij}^3}\Bigg\{ & 1-\frac{2(\beta+\gamma)}{c^2}\sum_{l\neq i}\frac{\mu_l}{r_{il}} \\ & -\frac{2\beta-1}{c^2}\sum_{k\neq j}\frac{\mu_k}{r_{jk}}+\gamma\left(\frac{\dot{s}_i}{c}\right)^2 \\ & +(1+\gamma)\left(\frac{\dot{s}_j}{c}\right)^2-\frac{2(1+\gamma)}{c^2}\dot{\mathbf{r}}_i\cdot\dot{\mathbf{r}}_j \\ & -\frac{3}{2c^2}\left[\frac{\left(\mathbf{r}_i-\mathbf{r}_j\right)\cdot\mathbf{r}_j}{r_{ij}}\right]^2+\frac{1}{2c^2}\left(\mathbf{r}_j-\mathbf{r}_i\right) \\ & \cdot\ddot{\mathbf{r}}_j\Bigg\} \\ & +\frac{1}{c^2}\sum_{j\neq i}\frac{\mu_i}{{r_{ij}}^3}\left\{\left[\mathbf{r}_i-\mathbf{r}_j\right]\right. \\ & \left.\cdot\left[(2+2\gamma)\,\dot{r}_i-(1+2\gamma)\,\dot{\mathbf{r}}_j\right]\right\}\left(\dot{\mathbf{r}}_i-\dot{\mathbf{r}}_j\right) \\ & +\frac{3+4\gamma}{2c^2}\sum_{j\neq i}\frac{\mu_j\ddot{\mathbf{r}}_j}{r_{ij}}\end{aligned}$$

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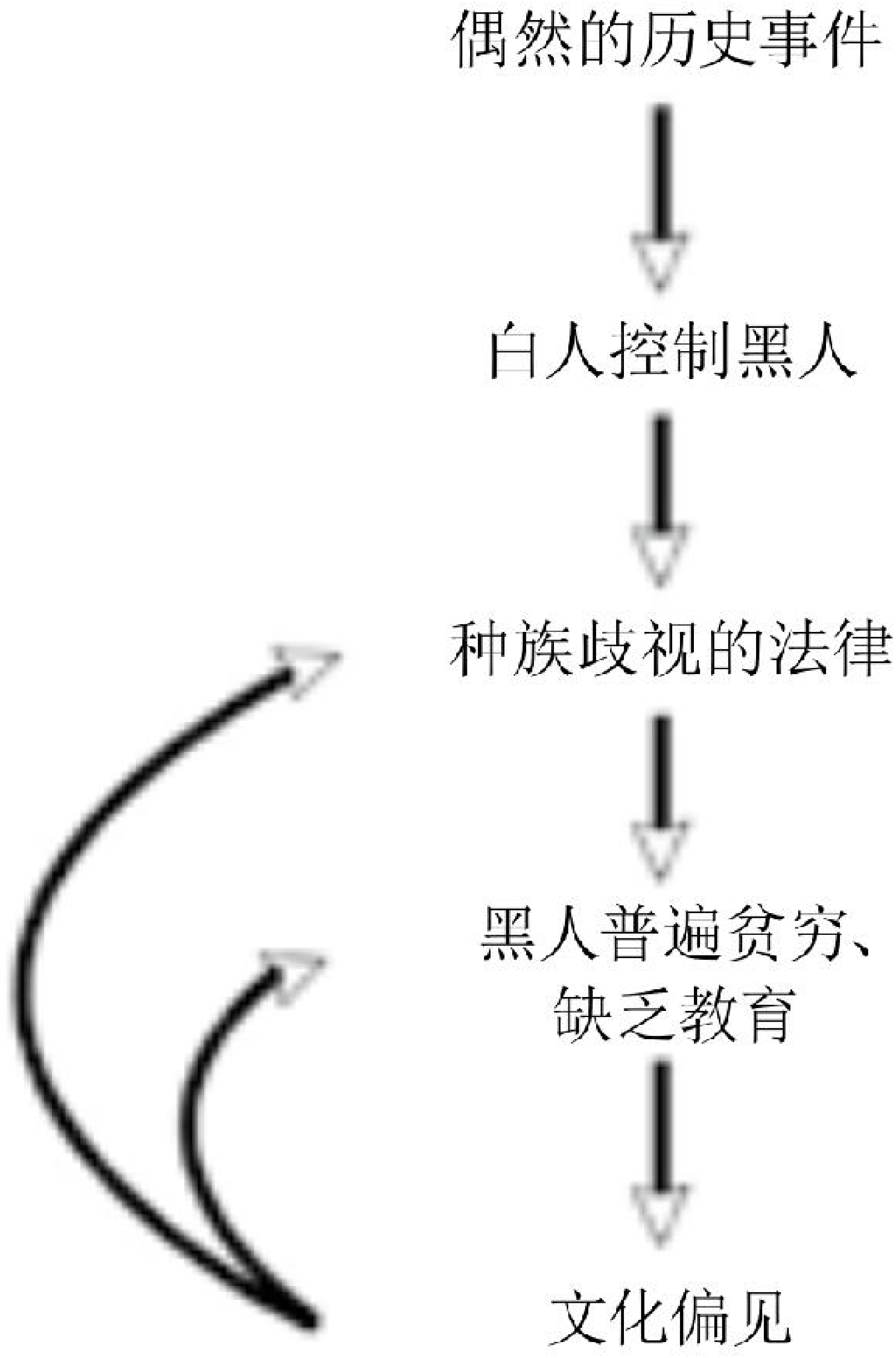
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偶然的历史事件
白人控制黑人
种族歧视的法律
黑人普遍贫穷、
缺乏教育
文化偏见

[illegible]20[illegible]19[illegible]1958[illegible]·[illegible]Clennon King[illegible]

[illegible]“[illegible]K[illegible]”[illegible]Ku Klux Klan[illegible]

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女性＝一种生物区别		女性＝一种文化区别	
古代雅典	现代雅典	古代雅典	现代雅典
XX 染色体	XX 染色体	无权投票	有权投票
子宫	子宫	无权担任法官	有权担任法官
卵巢	卵巢	无权任公职	有权任公职
睾酮浓度低	睾固酮浓度低	无权自行决定结婚对象	有权自行决定结婚对象
雌激素浓度高	雌激素浓度高	通常不识字	通常识字
有泌乳能力	有泌乳能力	法律上由父亲或丈夫拥有	法律上独立
完全相同		非常不同	

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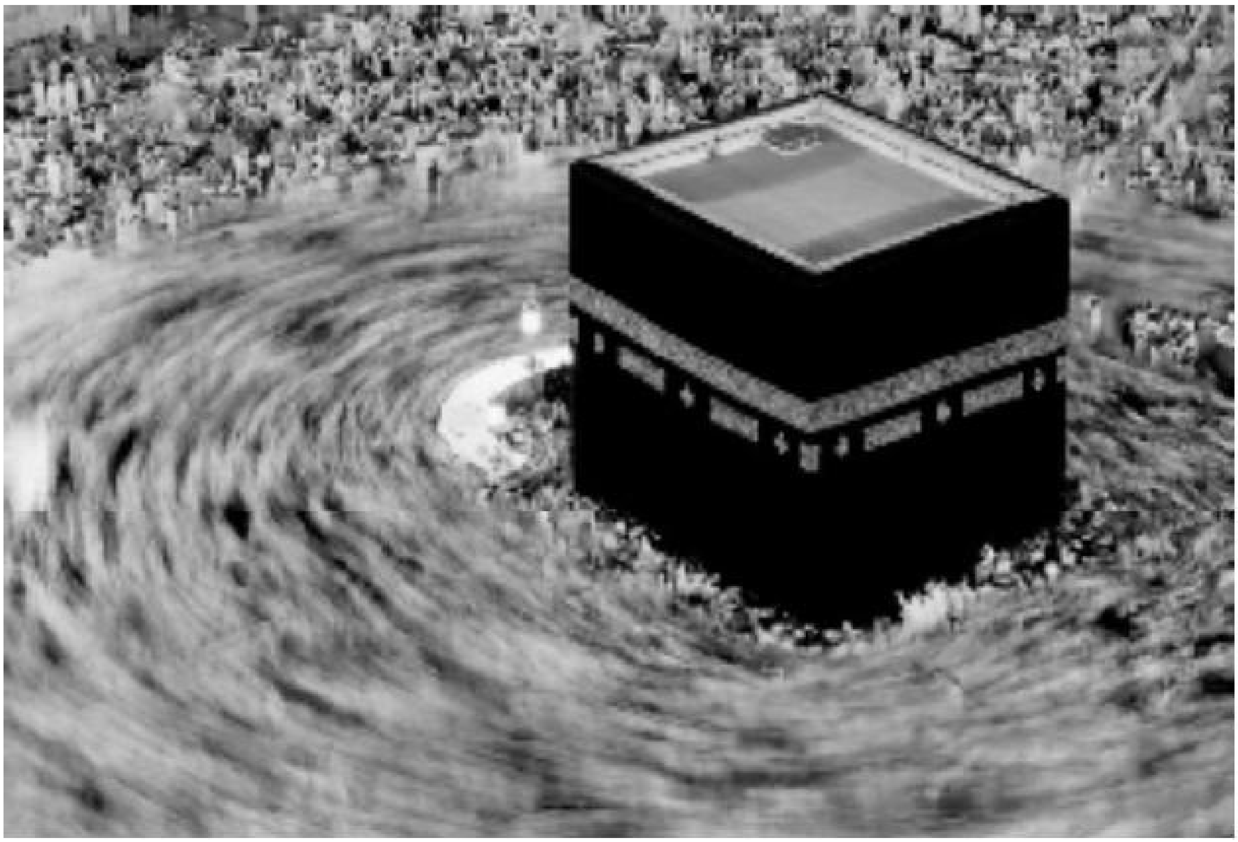
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不同阶段	古罗马帝国	伊斯兰帝国	欧洲帝国主义
一小群人建立一个大帝国	古罗马人建立古罗马帝国	阿拉伯人建立阿拉伯哈里发王朝	欧洲人建立欧洲帝国
形成帝国文化	希腊－古罗马文化	阿拉伯－穆斯林文化	西方文化
帝国文化得到属民认同接纳	属民接受拉丁文、古罗马法、古罗马的政治思想等等	属民接受阿拉伯语、伊斯兰教等等	属民接受英语和法语、社会主义、民族主义、人权等等
属民以共同的帝国价值为名，要求平等的地位	伊利里亚人（Illyrian）、高卢人和迦太基人以古罗马的价值观，要求与古罗马人享有平等地位	埃及人、伊朗人和柏柏尔人以穆斯林的价值观，要求与阿拉伯人享有平等地位	印度人、中国人和非洲人以西方的价值观（如民族主义、社会主义和人权），要求与欧洲人享有平等地位
帝国开国者失去主导地位	古罗马人不再是至高无上的族群，帝国的控制权转移到了由多民族精英组成的群体	阿拉伯人失去了对伊斯兰世界的控制权，形成多民族的穆斯林精英族群	欧洲人失去了对全球的控制权，形成多民族的精英族群
帝国文化继续蓬勃发展、发扬光大	伊利里亚人、高卢人和迦太基人继续发扬他们接受的古罗马文化	埃及人、伊朗人和柏柏尔人继续发扬他们接受的穆斯林文化	印度人、中国人和非洲人继续发扬他们接受的西方文化

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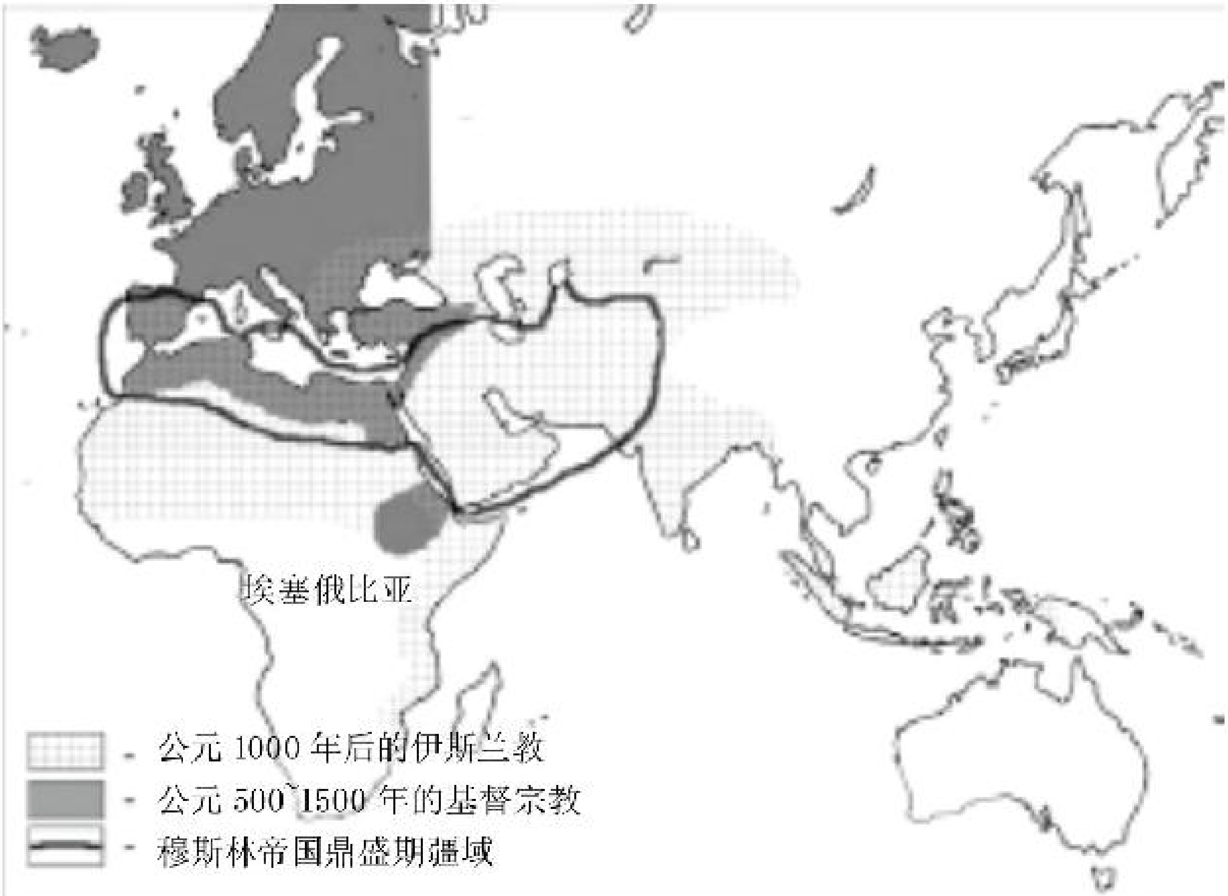
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公元500~1500年的基督宗教
穆斯林帝国鼎盛期疆域

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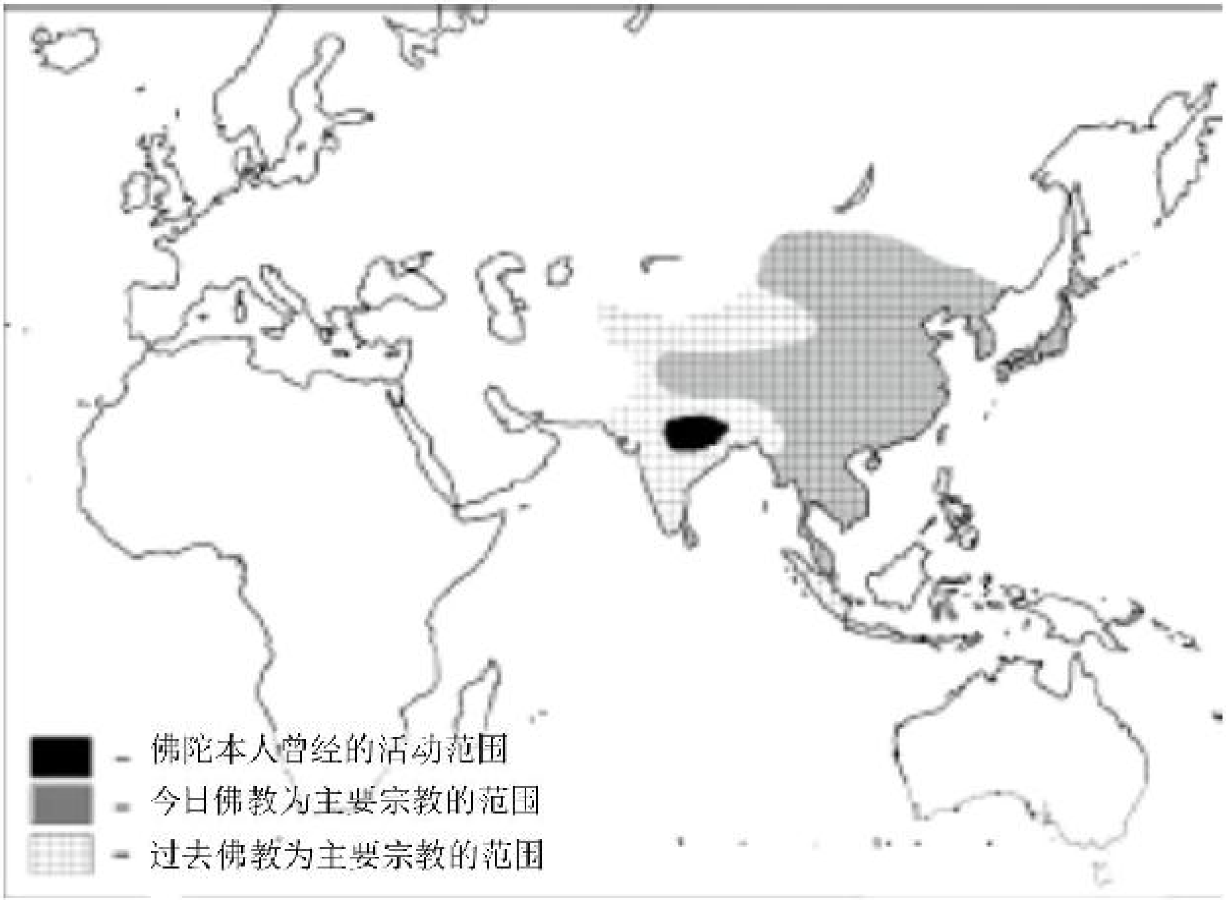
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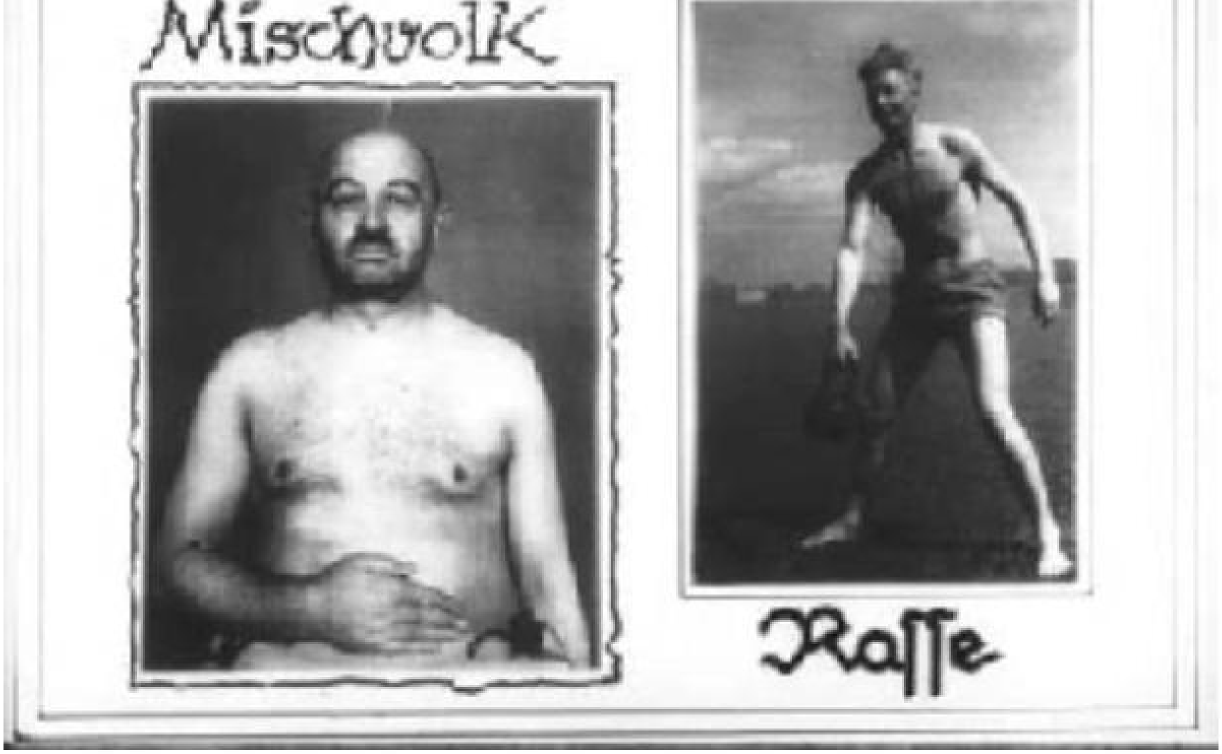
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自由人文主义	社会人文主义	演化人文主义
智人拥有独特且神圣的本质，与其他生物有根本上的不同。所谓的“至善”，讲的是对整体人性有好处。		
“人性”是个人的概念，存在于每个智人心中	“人性”是整体的概念，存在于所有智人整体之中	“人性”可变，可能退化成非人，也可能进化成超人
最重要的使命，是保护每个智人内心的自由	最重要的使命，是保护智人这个物种的平等	最重要的使命，是保护人类，避免退化成非人，并且鼓励进化成超人

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Mischvolk
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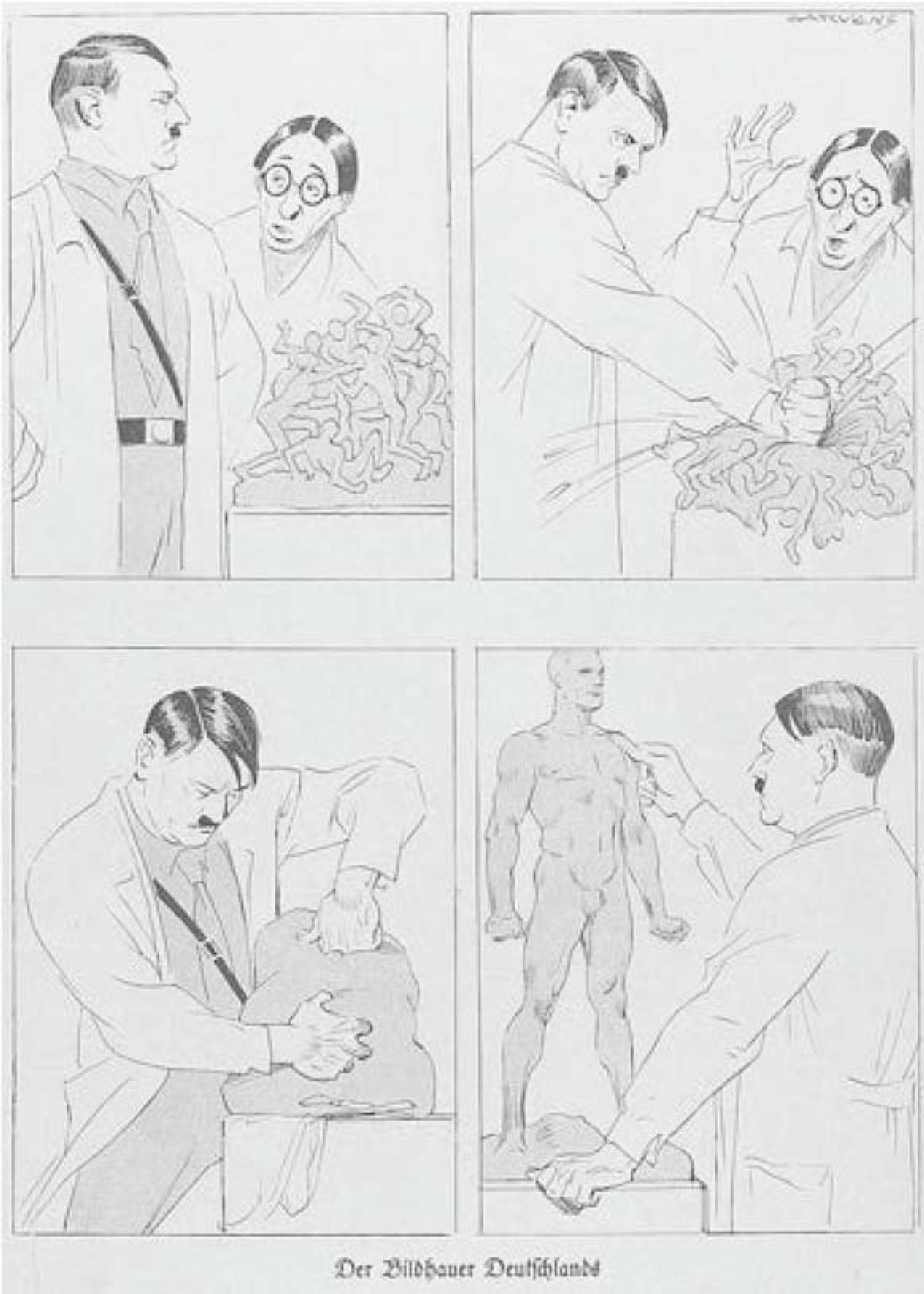
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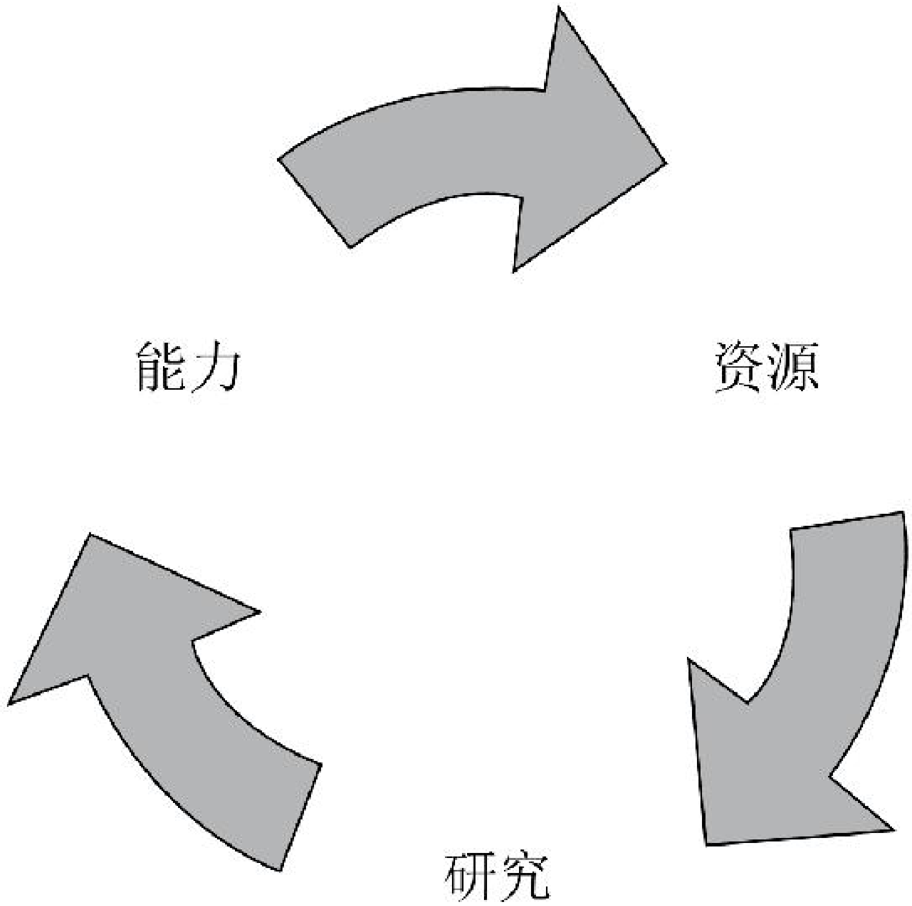
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2.[illegible]“[illegible]”[illegible]

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1687 *The Mathematical Principles of Natural Philosophy*

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$$(2)\ \sum \vec{F} = m\vec{a}$$

$$(3)\ \vec{F}_{1,2} = -\vec{F}_{2,1}$$

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1744[illegible]·[illegible]Alexander Webster[illegible]·[illegible]Robert Wallace[illegible]

[illegible]“[illegible]”[illegible]·[illegible]Colin Maclaurin[illegible]

[illegible]·[illegible]Jacob Bernoulli[illegible]Law of Large Numbers[illegible]·[illegible]Edmond Halley[illegible]50[illegible]Breslau[illegible]1238[illegible]1174[illegible]20[illegible]1[illegible]100[illegible]50[illegible]1[illegible]39[illegible]

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[illegible]probability cloud[illegible]

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7.[illegible]5[illegible]

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9.[illegible]10[illegible]

10.[illegible]58[illegible]

11.[illegible]2[illegible]

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13.[illegible]53[illegible]

14.[illegible]

15.[illegible]34[illegible]

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[illegible]16[illegible]10[illegible]62%[illegible]6[illegible]11[illegible]3[illegible]18%[illegible]40[illegible]

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[illegible] 18 [illegible] “[illegible]” [illegible]

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[illegible] ·[illegible] Charles Green [illegible] ·[illegible] Joseph Banks [illegible] ·[illegible] Daniel Solander [illegible] ·[illegible] James Cook [illegible]

[illegible] 1768 [illegible] 1769 [illegible] 1771 [illegible]

[illegible] 16 [illegible] 18 [illegible] 1747 [illegible]·[illegible] James Lind [illegible] C [illegible] C [illegible]

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[illegible] 90% [illegible]

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[illegible]“[illegible]”[illegible]

[illegible]1976[illegible]Truganini[illegible]English Royal College of Surgeons[illegible]2002[illegible]

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[illegible]1750[illegible]1850[illegible]1900[illegible]1950[illegible]5%[illegible][84][illegible]

[illegible]1850[illegible]“[illegible]”[illegible]

[illegible]1850[illegible]1770[illegible]Hussein Pasha[illegible]1770[illegible]

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[illegible]1830[illegible]1850[illegible]40000[illegible]4000[illegible]1880[illegible]35[illegible]3.5[illegible][85][illegible]1876[illegible]25[illegible]

1880[illegible]1888[illegible]10[illegible]1950[illegible]2500[illegible]7[illegible][86]

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[illegible]20[illegible]1500[illegible]1950[illegible]

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1831[illegible]“[illegible]”[illegible]HMS Beagle[illegible]22[illegible]

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1969[illegible]7[illegible]20[illegible]·[illegible]Neil Armstrong[illegible]·[illegible]Buzz Aldrin[illegible]11[illegible]

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Front National · · Marine le Pen “

” Party for Freedom Alliance for the Future of Austria

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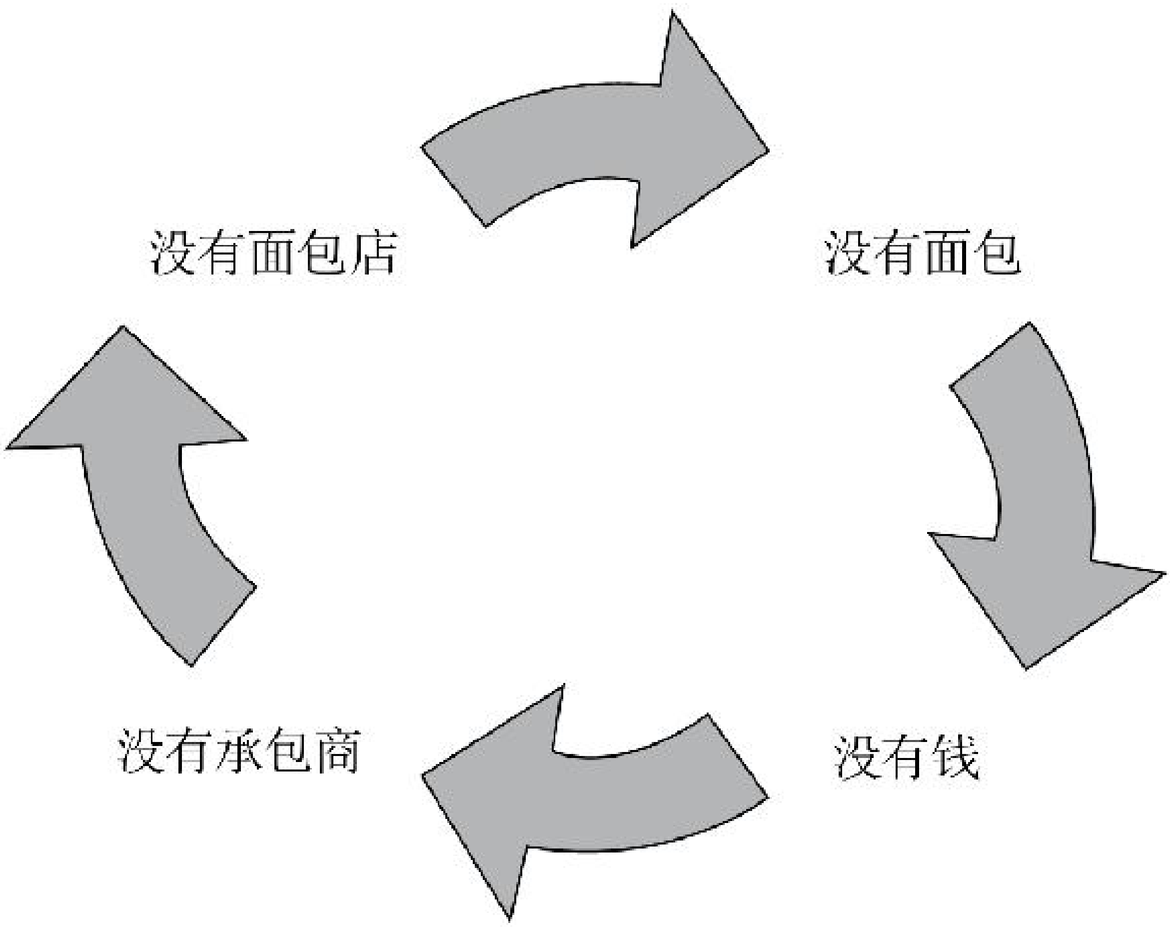
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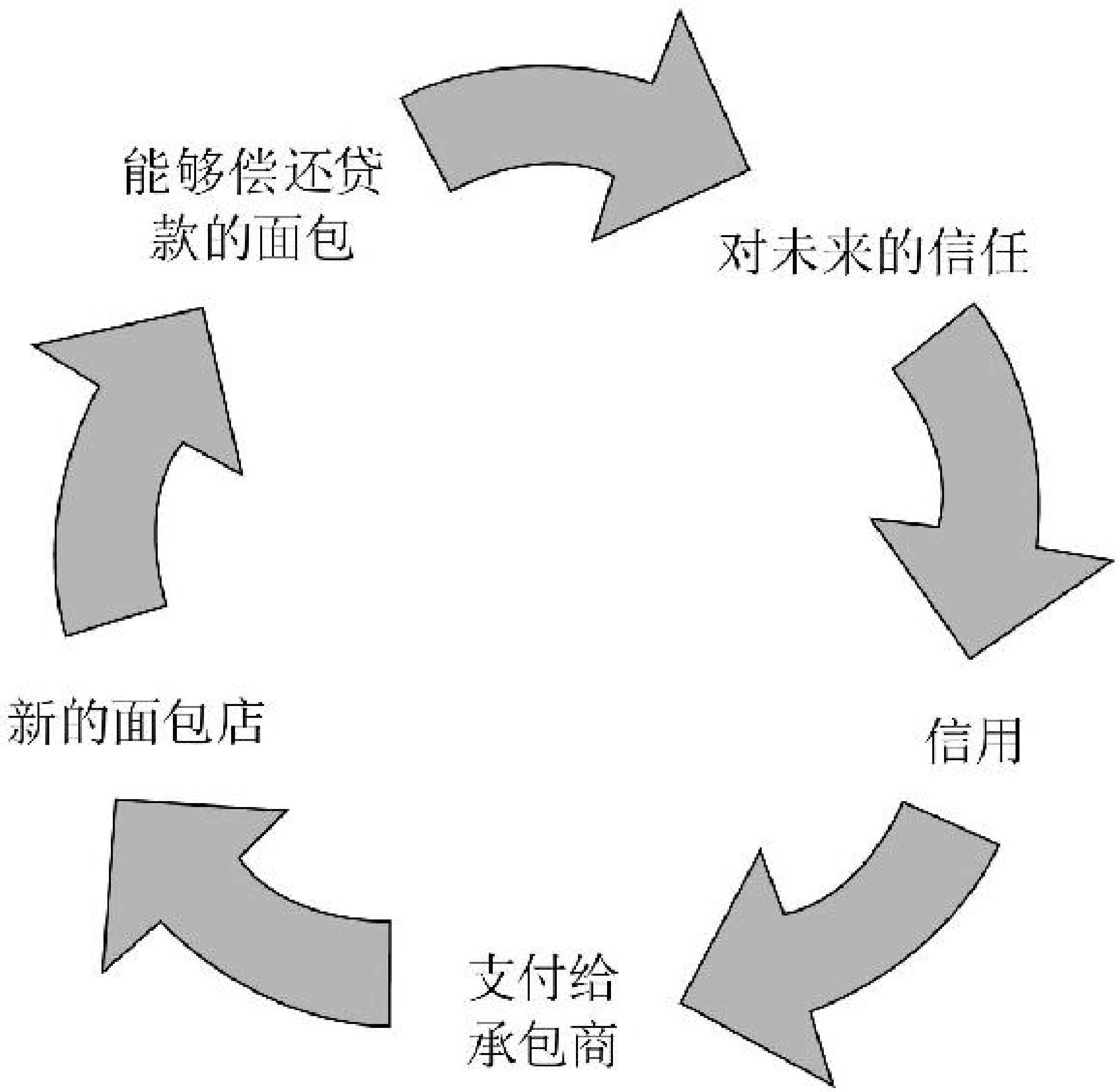
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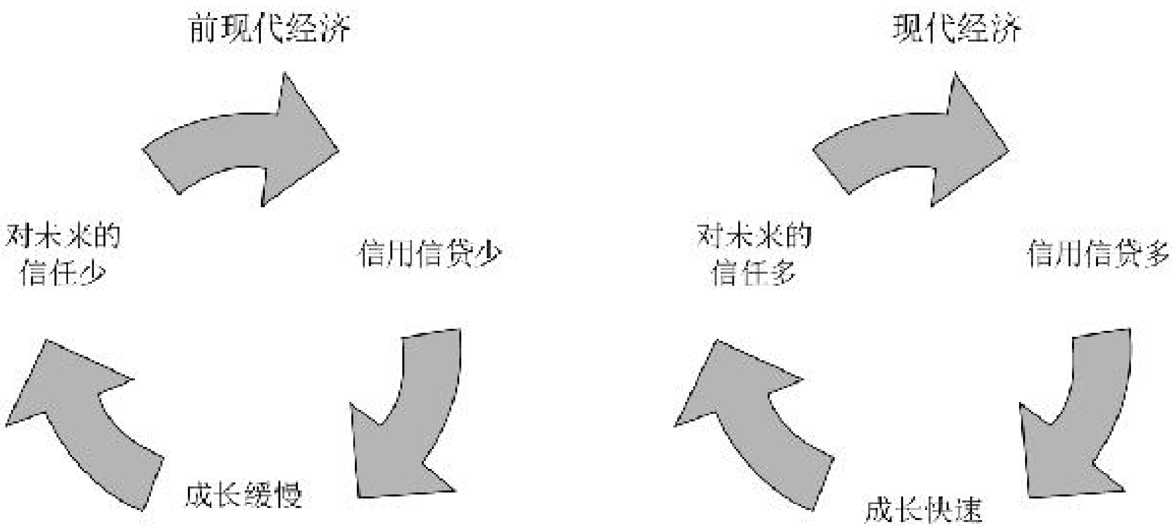
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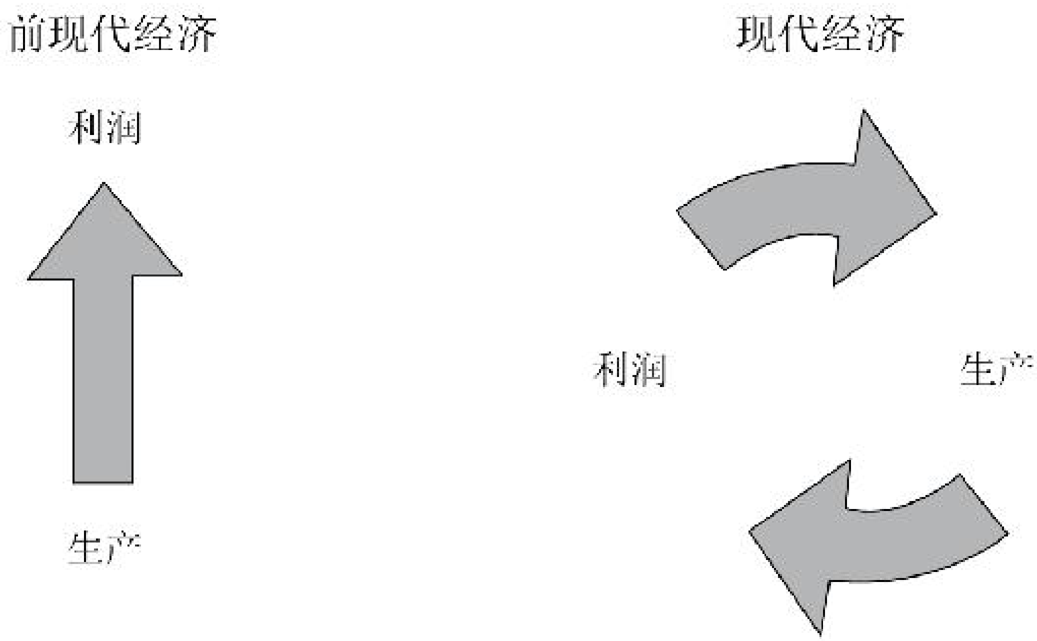

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2008

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Nader Shah

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[illegible]17[illegible]18[illegible]（Mississippi Bubble）[illegible]

[illegible]1717[illegible]（Mississippi Company）[illegible]（New Orleans）[illegible]·[illegible]（John Law）[illegible]1717[illegible]

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[illegible]（Leadenhall Street）[illegible]35[illegible]1858[illegible]“[illegible]”（nation of shopkeepers）[illegible]

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[illegible]1800～1858[illegible]19[illegible]

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1840[illegible]“[illegible]”[illegible]1997[illegible]19[illegible]4000[illegible]1/10。[93]

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1908[illegible]1945[illegible]2013[illegible]1500[illegible]500[illegible]

[illegible]8500[illegible]

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[illegible]2013[illegible]1913[illegible]

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[illegible]300[illegible]1700[illegible]1700[illegible]“[illegible]”[illegible]

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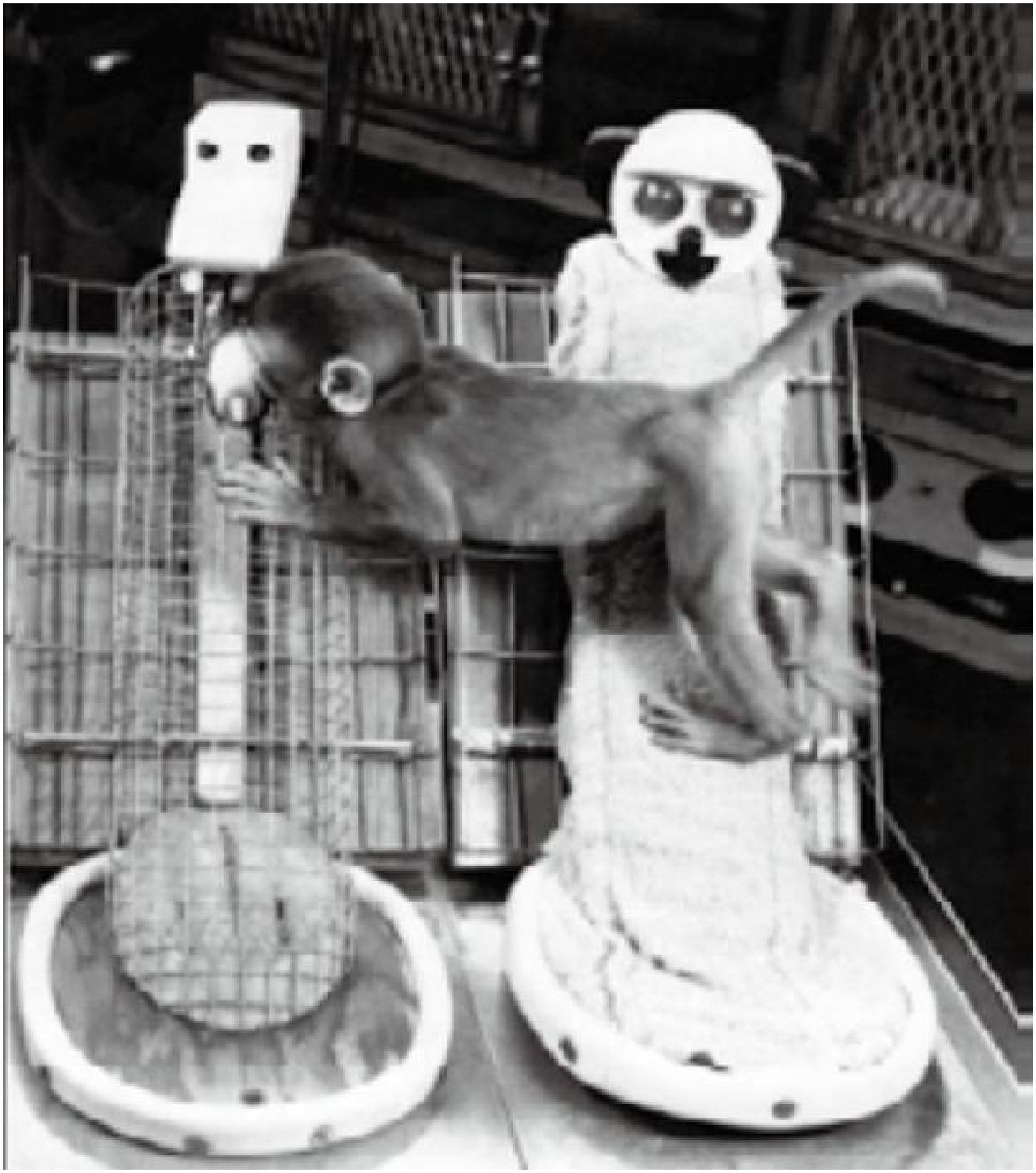
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[illegible]DNA[illegible]6500[illegible]

[illegible]1700[illegible]7[illegible]1800[illegible]9.5[illegible]1900[illegible]16[illegible]2000[illegible]60[illegible]2014[illegible]70[illegible]

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[illegible]8[illegible]00[illegible]7[illegible]55[illegible]1784[illegible]12[illegible]00[illegible]12[illegible]20[illegible]11[illegible]50[illegible][105]

[illegible]1830[illegible]10[illegible]1847[illegible]1880[illegible]

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[illegible]DVD[illegible]

[illegible]7[illegible]50[illegible]3[illegible]7[illegible]40[illegible]7[illegible]50[illegible]

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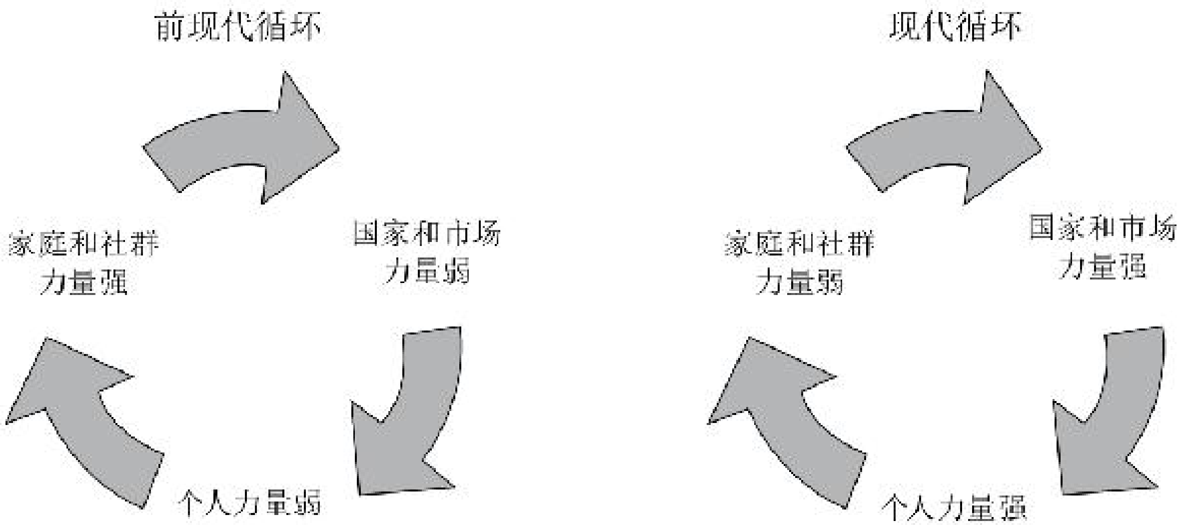
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[illegible]1368~1644[illegible]“[illegible]”[illegible]10[illegible]“[illegible]”[illegible]110[illegible]“[illegible]”[illegible]

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前现代循环
家庭和社群
力量强
国家和市场
力量弱
个人力量弱
现代循环
家庭和社群
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[illegible]2000[illegible]31[illegible]52[illegible]2000[illegible]83[illegible]5600[illegible]1.5%[illegible]126[illegible]2.25%[illegible]81.5[illegible]1.45%[illegible][107]

2002[illegible]5700[illegible]17.2[illegible]56.9[illegible]74.1[illegible]87.3[illegible][108][illegible]

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[illegible]20[illegible]1964[illegible]1985[illegible]20[illegible]Arawete[illegible]Yanomamo[illegible]25%~50%[illegible][111]

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1989[illegible]1989[illegible]·[illegible]·[illegible]

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[illegible]1945[illegible]1962[illegible]2014[illegible]

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[103][illegible]“[illegible]”[illegible]intimate community[illegible]

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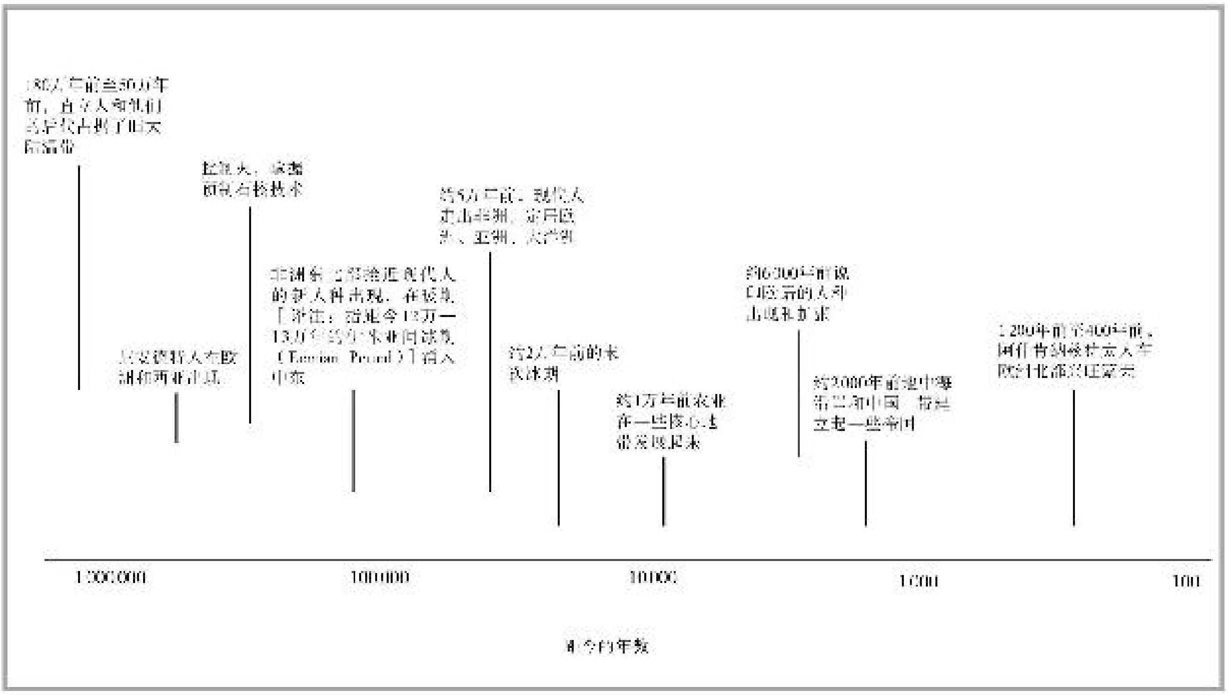
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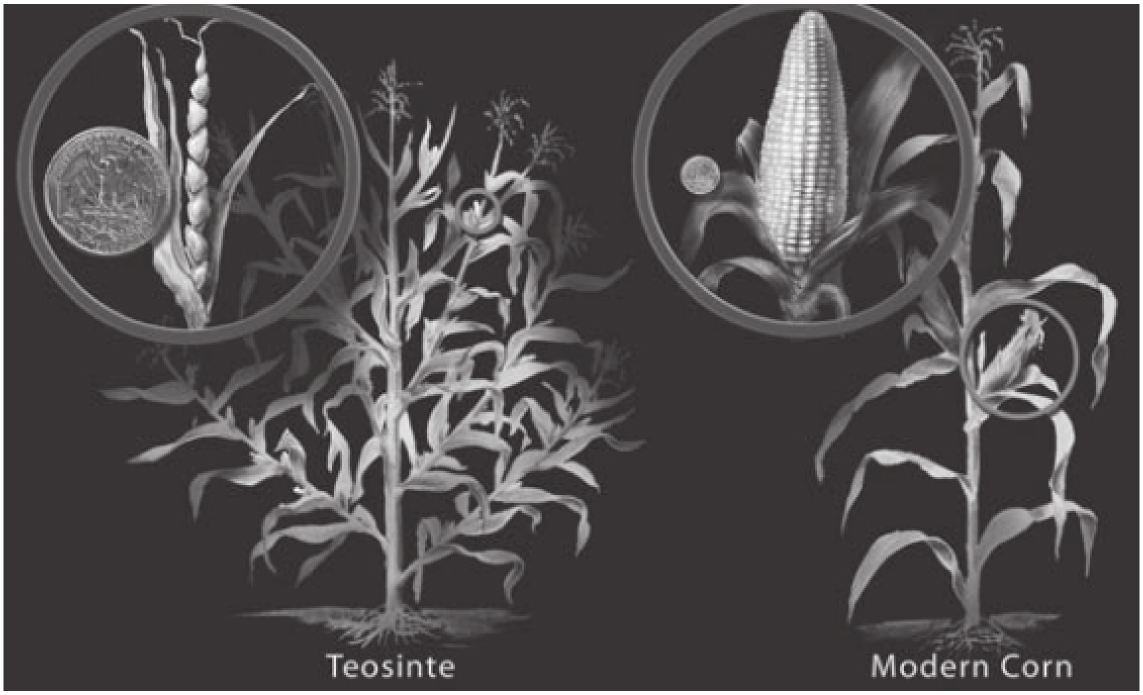
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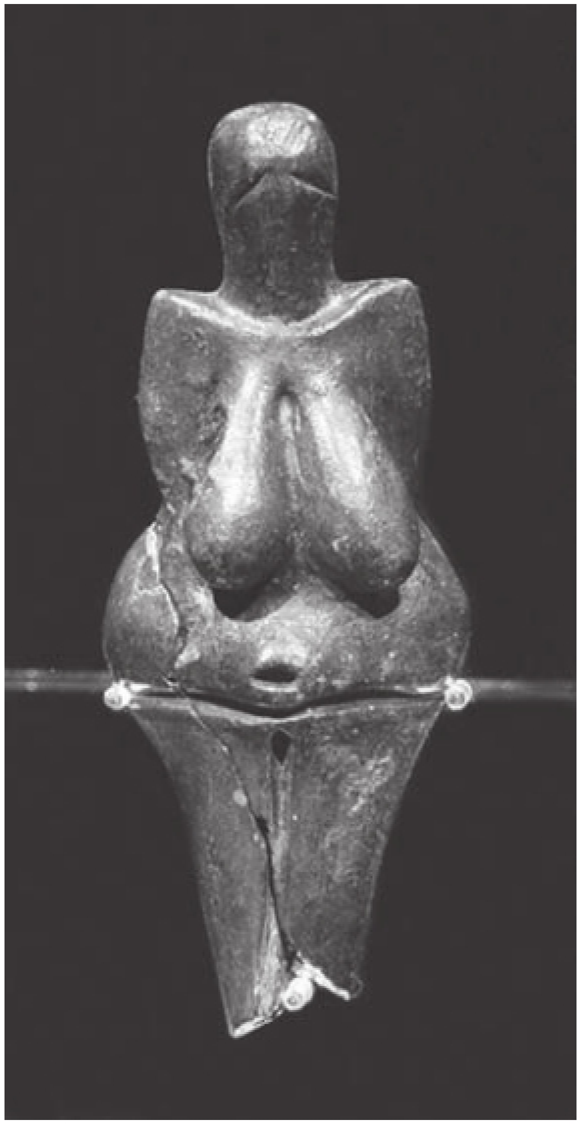
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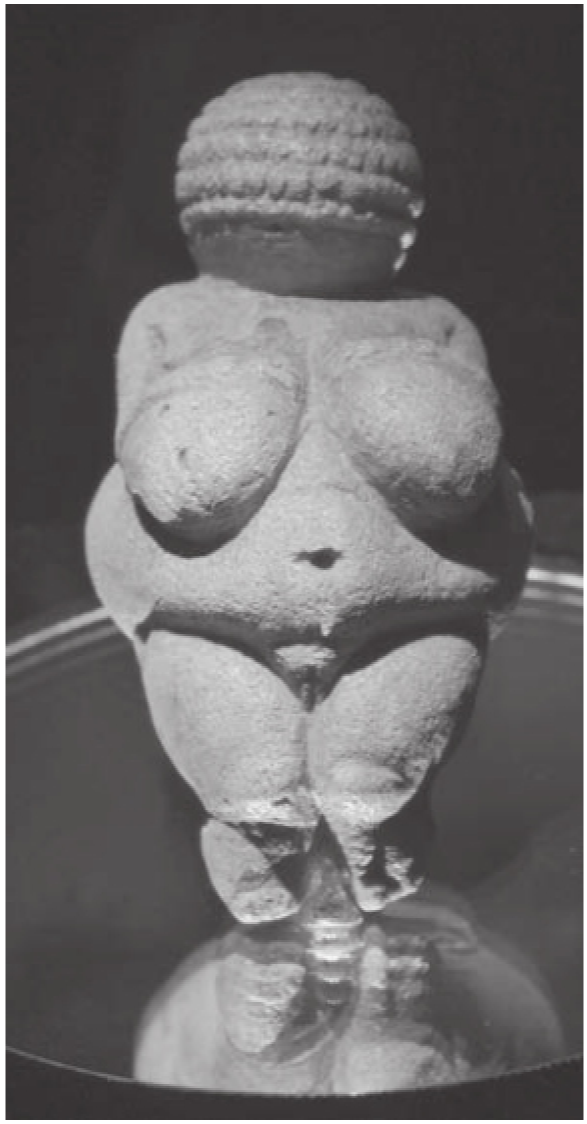
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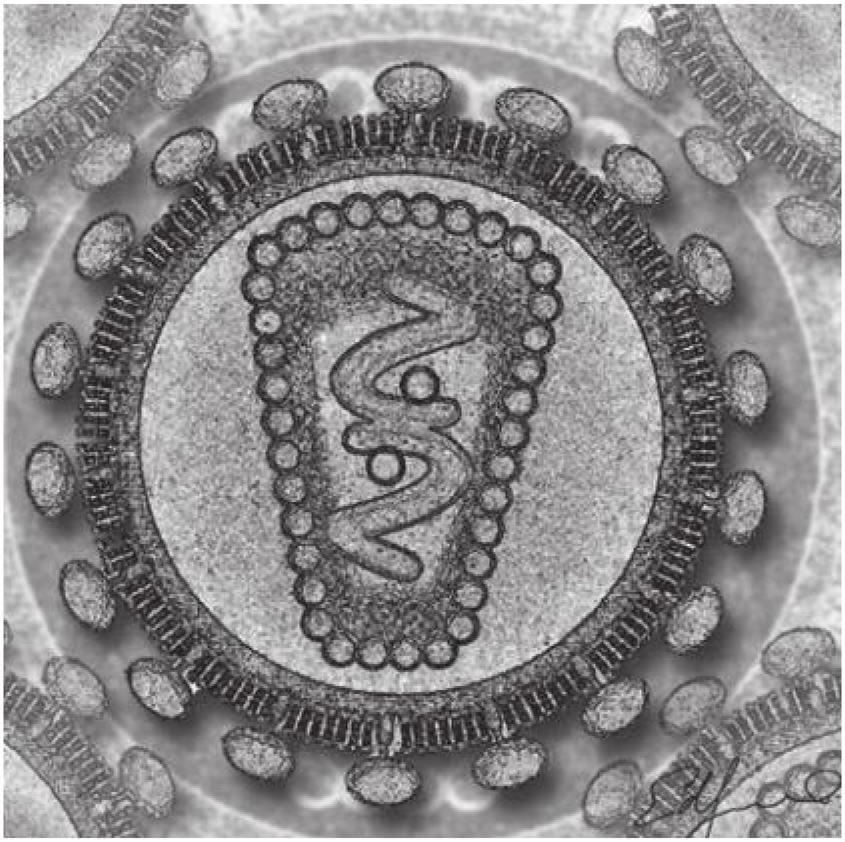
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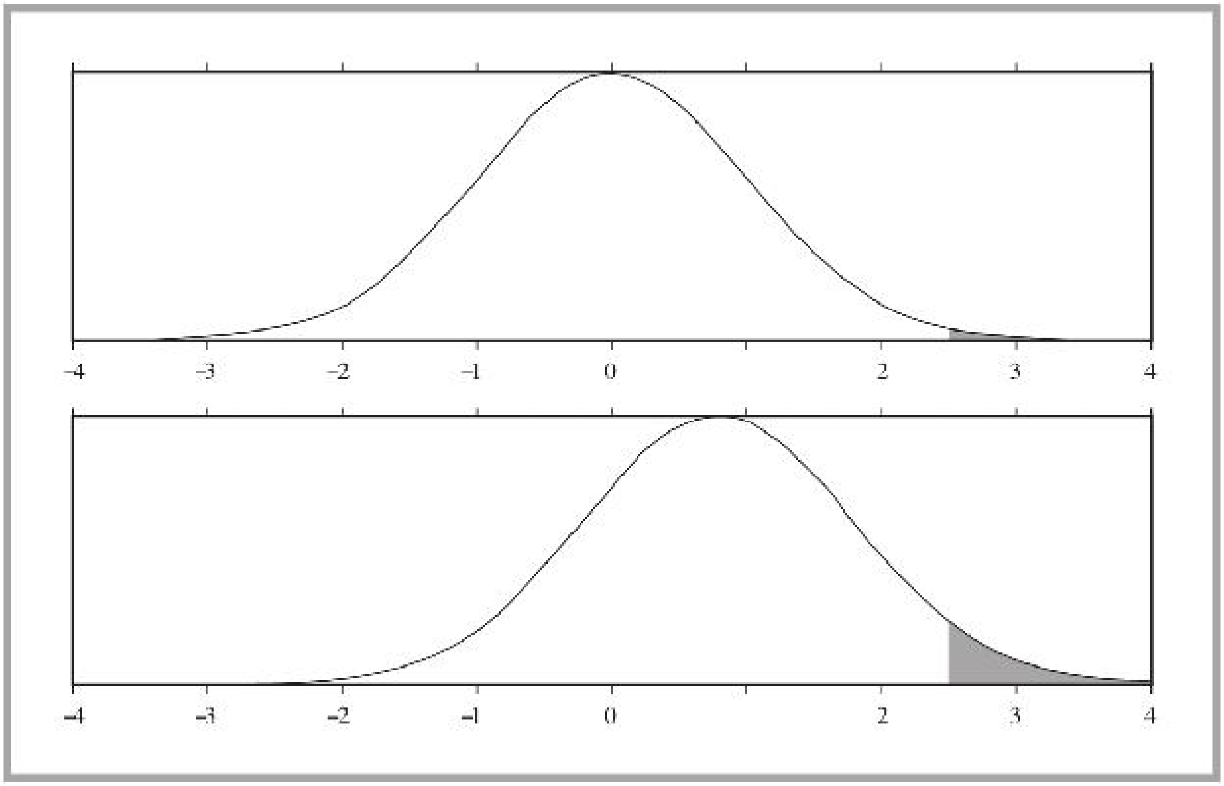
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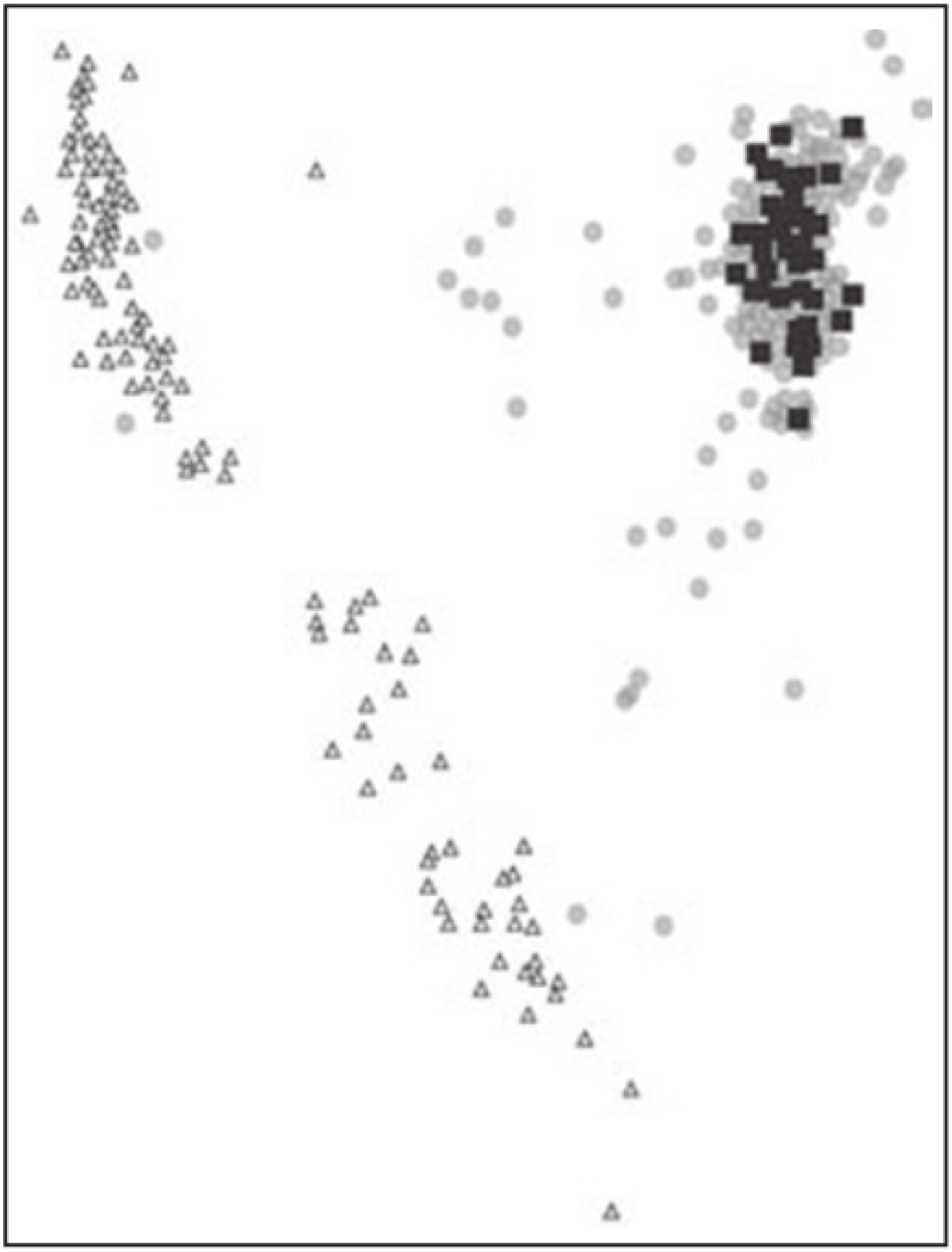
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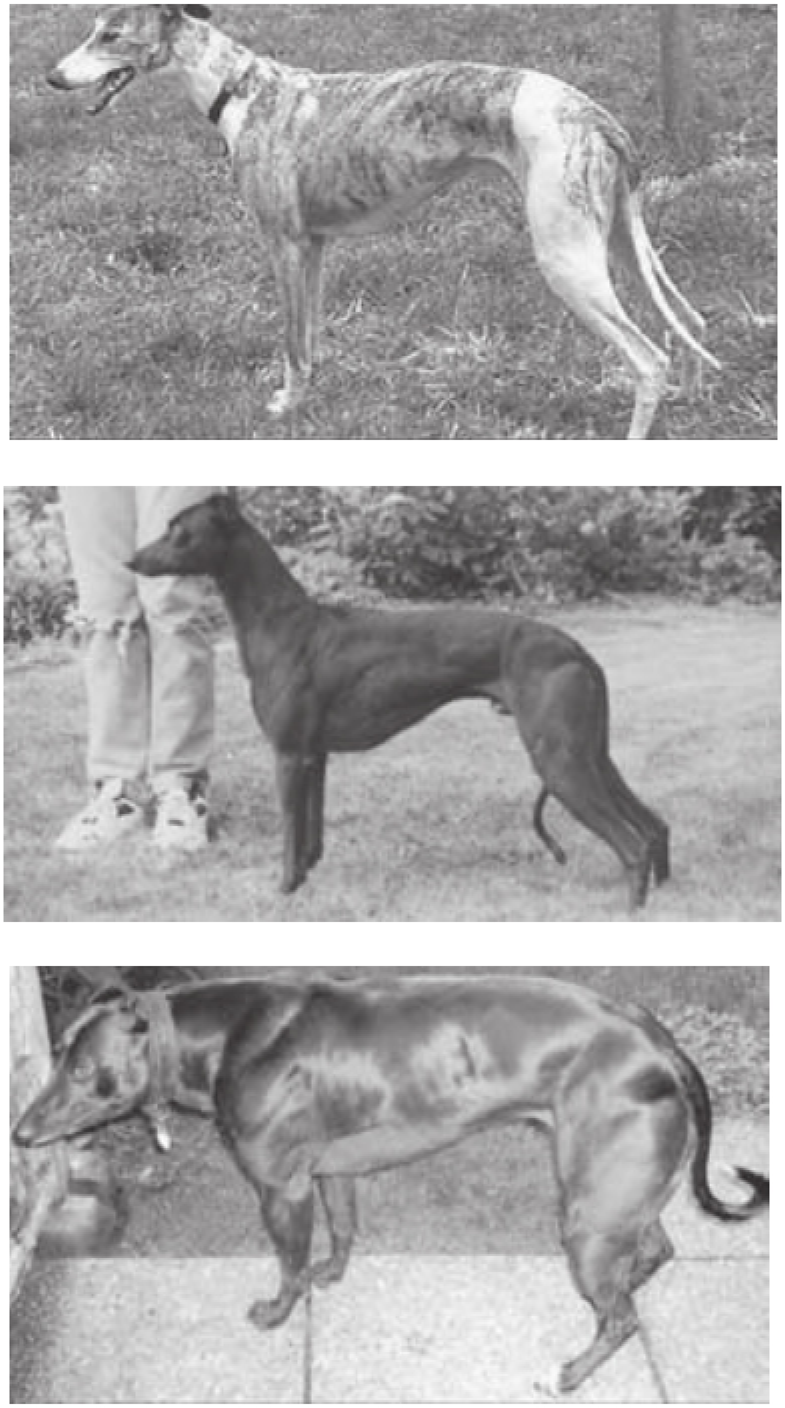
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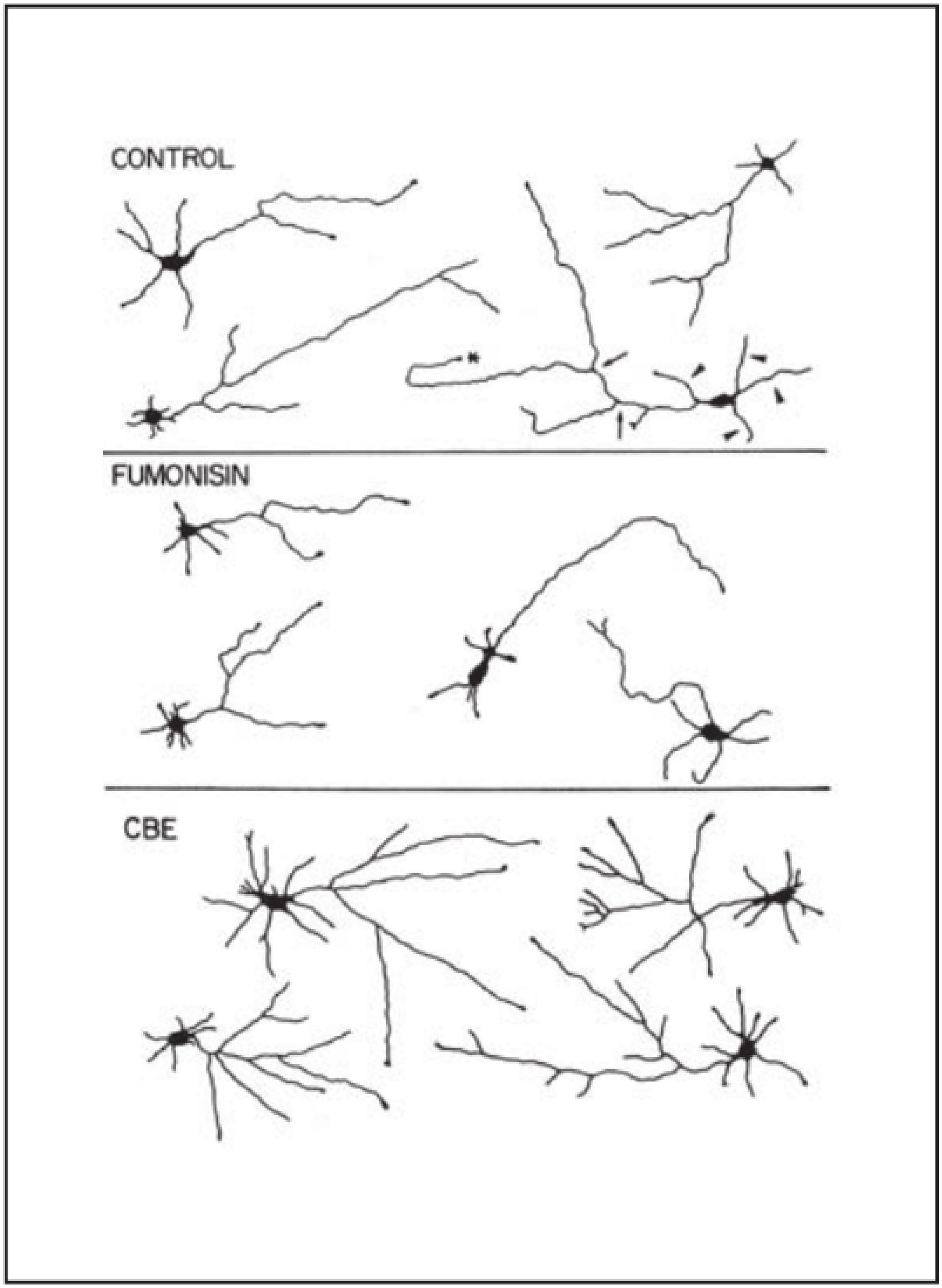
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